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# The Impact of State Fiscal Effort on Student Achievement Measured By Math Scores From the National Assessment of Education Progress (NAEP)

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# THE IMPACT OF STATE FISCAL EFFORT ON STUDENT ACHIEVEMENT MEASURED BY MATH SCORES FROM THE NATIONAL ASSESSMENT OF EDUCATIONAL PROGRESS (NAEP)

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## ABSTRACT

THE IMPACT OF STATE FISCAL EFFORT ON STUDENT ACHIEVEMENT MEASURED BY MATH SCORES FROM THE NATIONAL ASSESSMENT OF EDUCATION PROGRESS (NAEP)

Lorena LeeAnn Kelly
Old Dominion University, 2012
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The current financial state of our nation, in combination with the pressure to meet state accountability testing and a global call for better prepared twenty first century learners, has produced a situation where all levels of government have to make difficult decisions regarding expenditures. In order to ensure that education receives appropriate funding, research is necessary to show a relationship between spending and student achievement. This study examines the effects of sustained increases and decreases in state fiscal effort on student achievement measured by scores from $4^{th}$ and $8^{th}$ grade math NAEP scores over an eighteen year period. A quantitative analysis of the data showed that fiscal effort, independently, is not a significant predictor of student achievement. However, the combined effects of fiscal effort and the percentage of students eligible for free and reduced price lunch (FRPL) significantly predict student achievement. In high poverty schools, sustained increases in fiscal effort result in decreased student achievement. In low poverty schools, sustained increases in fiscal effort result in increased student achievement.

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# CHAPTER 1

## Introduction

Educational leaders must have a solid understanding of educational funding and its effect on student outcomes to support equity among all students. The association between funding and student achievement has been a disputed topic for decades. The current climate of accountability and equity combined with the financial stress of our nation has heightened the need for valid data regarding the relationship between funding and student achievement. Inequities apparent in public education, such as achievement gaps identified by accountability testing mandated by No Child Left Behind (NCLB), demonstrate the need for socially just leaders in education to acknowledge and understand the relationship between funding and achievement (Scheurich & Skrla, 2003). Effective educational leaders use their unique positions to identify inequities, to analyze the causes of the inequities, and to enact change that will rectify the inequities (Dantley & Tillman, 2010). Providing adequate resources to education for all students is an investment in human capital.

> Education is a significant investment in human capital that has clear benefits for the individual, the economy, and the society at large. Increased levels of education result in higher incomes, increased taxes, increased participation in the arts, decreased societal costs, and decreased levels of childbirth complications. Instead of thinking of education as a cost to taxpayers, think of education as a long-term investment that pays significant dividends (Owings & Kaplan, 2006, p. 95).

Educational leaders must have a clear understanding of the funding of public education on a federal, state, and local level. Funding decisions are made by educational leaders at all levels of government from state superintendents to building administrators. Understanding educational funding and recognizing the effects of funding are crucial for all educational leaders to make informed and positive decisions at their level of responsibility. Considering reports indicating little growth in student achievement scores according to the National Assessment of Educational Progress (NAEP) since 1983 despite increases in per-pupil expenditures (U.S. Department of Education, 2008) and claims that U.S. students are lagging behind their international counterparts demonstrates the necessity for educational leaders to be knowledgeable regarding this topic (Darling-Hammond, 2007). This knowledge is extremely important from a policy and practice perspective; understanding and analyzing educational expenditures assists with the identification of policies and practices that improve student achievement.

## Funding Public Education

### Federal Perspective

Public education is a responsibility of the states and defined operationally in all state constitutions. It is not mentioned in the U.S. Constitution; therefore, by virtue of the 10th Amendment, it is not a responsibility of the federal government. However, the federal government has promoted and financed education predating the ratification of the constitution (Owings & Kaplan, 2006). The strong belief of the founding fathers that education was necessary for the well-being of the nation explains the interest of federal government in public education (Alexander & Alexander, 2009). Although the founding fathers understood the importance of public education, they believed the states, not the

federal government, should have the responsibility of public education (Alexander & Alexander, 2009).

While public education is the legal responsibility of the states, it is funded by a combination of federal, state, and local government sources. Figure 1 is a representation of elementary and secondary education revenue between 1970 and 2008. The figure illustrates federal revenue as relatively consistent over the past 38 years, ranging between eight and ten percent. Local and state revenues have varied with one outpacing the other at different points over the 38 year period. Currently, states provide 48.3 percent of funds and localities provide 43.5 percent of funds. Figure 2 demonstrates the current percentages for all levels. It is important to note that the figure displays a national average. The latest data published by the U.S. Department of Education (2011) report variations across states regarding the expenditures of state and local governments; 25 states provide the majority of education revenue, 15 states provide a lesser percentage than the local government, and 10 states do not indicate either state or local government as providing the majority of education expenditures. While all levels of government assist with the funding of public education, the majority of the funding is left to the states due to the legal responsibility held by the states.

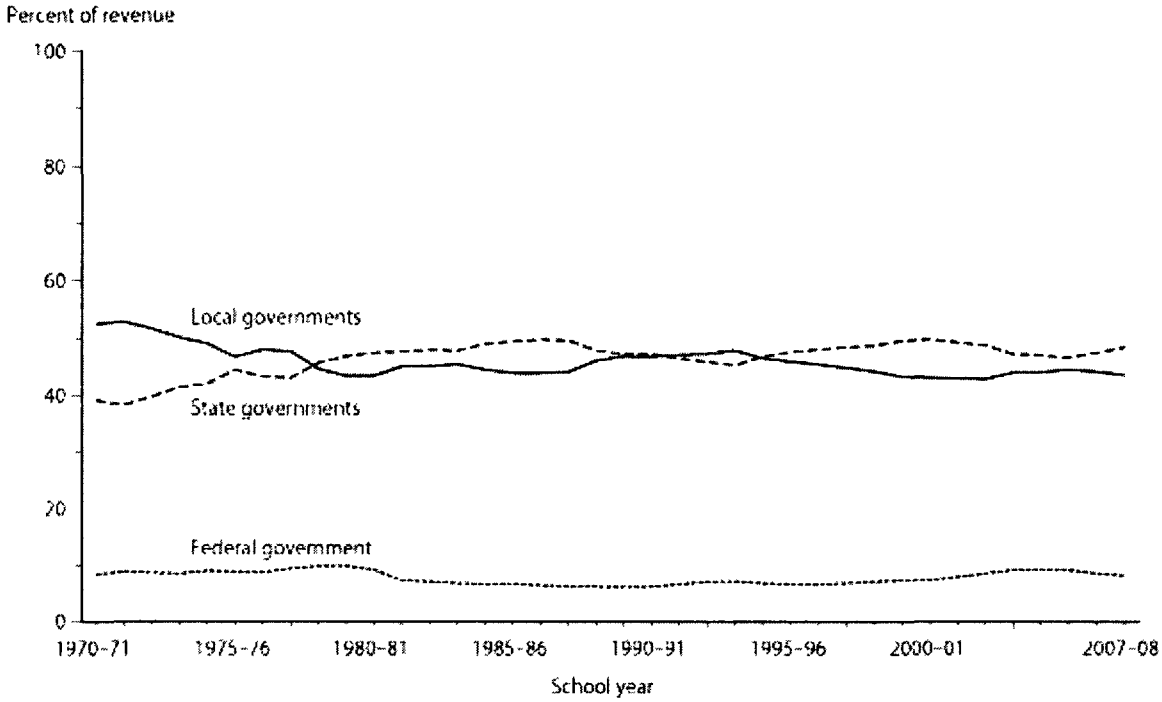


*Figure 1*. Percentage of revenue for public elementary and secondary schools, by source of funds: 1970–71 through 2007–08.

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Source: Snyder, T.D., and Dillow, S.A. (2011). *Digest of Education Statistics 2010* (NCES 2011-015). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC., p. 67.

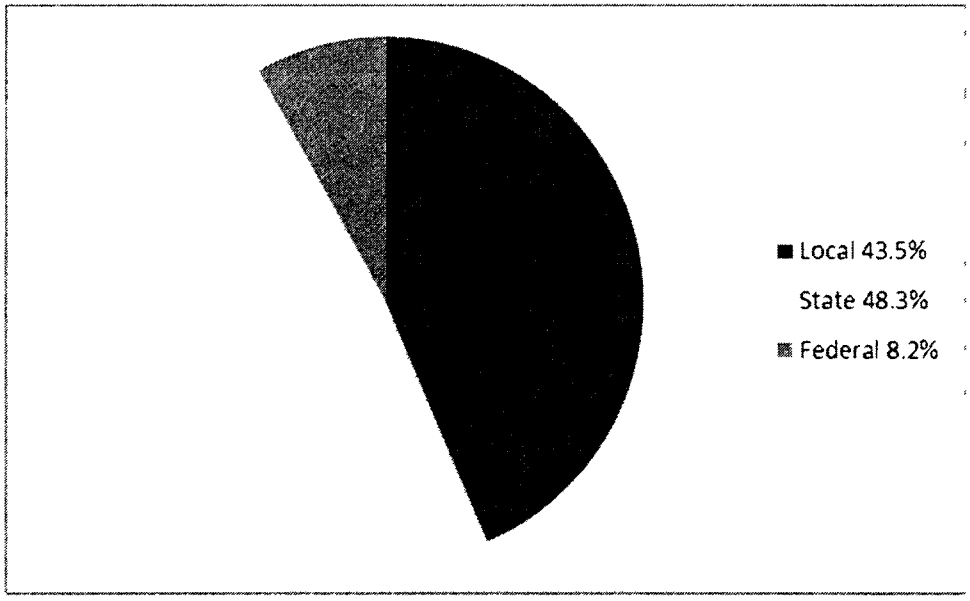


*Figure 2.* Percentage distribution of revenue for public elementary and secondary education in the United States, by source: Fiscal year 2008.

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From U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), "National Public Education Financial Survey (NPEFS)," fiscal year 2008.

Educational expenditures have been tracked at federal, state, and local levels throughout our nation's history. Over the past 50 years, spending for elementary and secondary education has increased between 250 to 300 percent (Snyder, Dillow, & Hoffman, 2009). Figure 3 illustrates the expenditures in billions from 1960 to 2008. While this demonstrates a large increase in spending, an understanding of the factors that contributed to the increase is necessary for analysis. Legislation passed during this time period is a large factor contributing to the significant increase. In 1965, the Elementary and Secondary Education Act (ESEA) was enacted with the intent to improve education for poor children (Public Law 89-10). This marked an increase in federal expenditures for education (Spellings, 2005). Another example is Public Law 94-142, the Education for All Handicapped Children Act, which was enacted by Congress in 1975. The law

provided a free and appropriate education for all students with disabilities. To provide necessary services to students with special needs the student teacher ratios were reduced resulting in an increase in teaching positions. The past 30 years has also shown a large increase in the percentage of students meeting eligibility criteria for special education services. The percentage has increased from 8.3% in 1976-77 to 13.2% in 2006-07 (Snyder, Dillow, & Hoffman, 2009). The reauthorization of the ESEA in 2002, No Child Left Behind Act (NCLB), calls for all states to have standards and an assessment system to ensure a high quality education for all students (Public Law 107-110). States must meet Annual Yearly Progress (AYP) benchmarks according to specified indicators. In addition to legislation, K-12 public school enrollment has increased from 36.1 million in 1960 to 49.3 million students (Snyder & Dillow, 2011). An increase in student enrollment causes an increase in the number of teachers employed. All of these factors have contributed to the large increase in spending for education over the past 50 years.

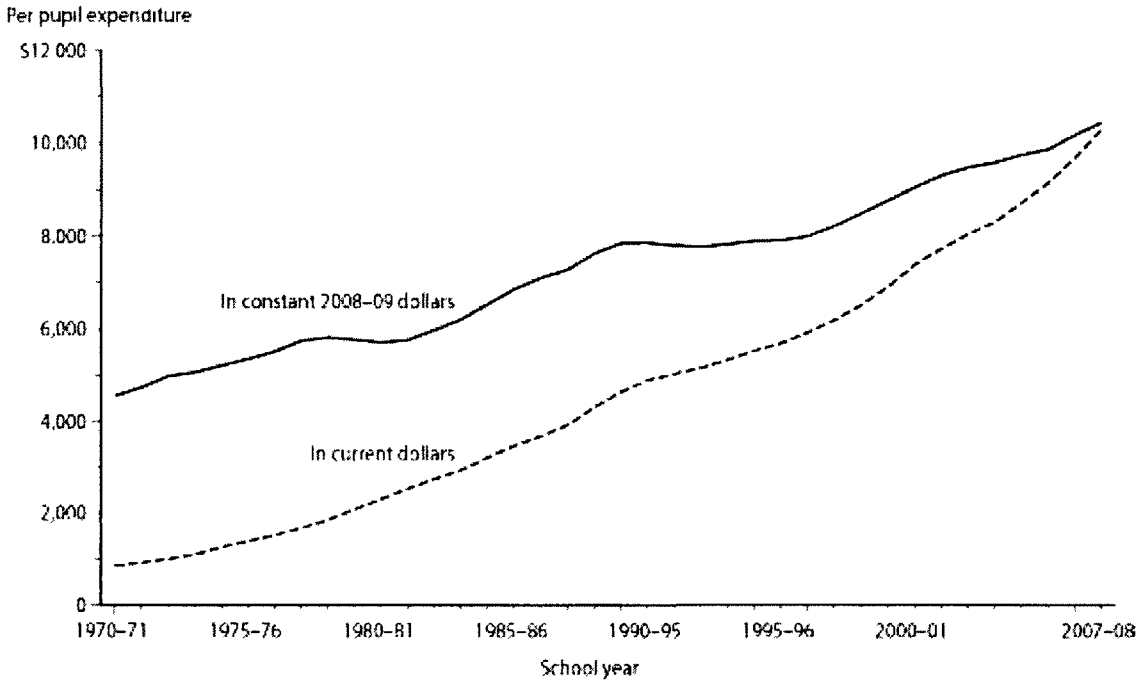


*Figure 3*. Current expenditure per pupil in fall enrollment in public elementary and secondary schools: 1970–71 through 2007–08.

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Source: Snyder, T.D., and Dillow, S.A. (2011). *Digest of Education Statistics 2010* (NCES 2011-015). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC., p. 67.

**State Perspective**

As mentioned previously, the responsibility of public education falls on the states. Although all states provide funding for education, state funding is not consistent across all states. Per pupil expenditure is often used as a measure of state funding. Per pupil expenditure is the amount spent for a specific time period divided by a unit of measure, such as average daily attendance or fall enrollment (Snyder & Dillow, 2011). While this gives an indication of how much is spent on education in a particular state, it does not show the entire picture. Per pupil expenditure does not take into consideration the wealth

of the state. In order to get a clear picture of a state's spending towards education, it is important to consider the fiscal capacity of the state. A more descriptive measure of a state's spending towards education is fiscal effort. Fiscal effort is a ratio of total per pupil expenditure and a measure of state wealth comprised of the Gross State Product (GSP) on a per capita basis (Owings & Kaplan, 2006). Calculating fiscal effort for each state provides a more detailed picture of its expenditures towards education. It provides a picture of how much a state values education. For example, it is important to consider fiscal effort because a wealthier state may have a slightly higher per pupil expenditure than a less wealthy state; however, the less wealthy state may actually be expending a higher percentage of its revenue towards education. Understanding funding for education is necessary to ensure effective decision making considering the current national fiscal situation.

## Significance of the Study

Our nation is under fiscal stress. Public education is funded by the federal, state, and local government with the majority of the funding derived from state and local funds. It is necessary to identify any correlations between funding and student outcomes. In a time when money matters, the call for 21st century learners and global competition is present, and the pressure is mounting to meet AYP benchmarks. Much of the previous research regarding the correlation of expenditures and student outcomes has had several limitations. Per pupil expenditure has been used in many studies examining expenditures and student outcomes. Using per pupil expenditure provides a limited understanding of a state's funding towards education. The studies have also focused on specific states or schools over short periods of time. This type of research provides poor generalizability

and fails to show the implications of spending over time. This study expands on current research by investigating the fiscal effort of all states and the District of Columbia in relation to student outcomes measured as scores from the National Assessment of Educational Progress (NAEP) for math from 1992 to 2009.

Investments are made with an expectation that favorable returns will occur over time. Investments in education are no different. They take time as well. At this time, no literature has examined the long-term association between increased and decreased fiscal effort towards education and long-term student outcomes. This study uses eighteen years of fiscal effort data points to determine states with increasing and decreasing slopes in effort. This study emphasizes the relationship over time as the research indicates that it takes 5 to 7 years to make systemic changes when examined in educational and management studies (Berman & McLaughlin, 1978). An examination of federally funded educational innovations conducted by the Rand Corporation shows that time is needed for specific stages to occur before a sustained effect on student outcome is produced (Berman & McLaughlin, 1978). The first two to five years are necessary to get the innovation started. Another two years are necessary for the innovation to be fully implemented. Lastly, student outcomes are affected one to two years after full implementation (Berman & McLaughlin, 1978). While outcomes from innovations are visible after five to eight years, they are fragile (Fullan, 2000). A change in leadership or direction can easily alter the effect of the innovation (Fullan). Therefore, using eighteen years of fiscal data points to determine increased and decreased slope in fiscal effort increases the reliability of the outcomes.

This study focuses on student outcomes based on math NAEP scores with 4th and 8th graders. NAEP scores are used to explore the relationship between increased and decreased state effort over time and student outcomes. NAEP is a system of common assessments that is implemented across the United States to measure student achievement. It is important to note that the NAEP has two components: the Main NAEP and the Long-Term Trend Assessments. This study utilizes data from the Main NAEP due to the fact that Main NAEP reports scores at the state level while Long-Term Trend Assessments are reported as national scores (U. S. Department of Education, 2009). NAEP is the first common measure of assessment that provides a source for statistically valid measures of achievement of representative samples of students nationally (Grissmer & Flanagan, 2001). The lack of a national curriculum has led individual states to develop their own standards and assessments. Therefore, using specific state assessments does not provide valid data for cross-state comparisons. The NAEP provides data that can be used for comparative state analysis. NAEP is administered by the National Center for Education Statistics (NCES) as part of the Institute of Education Sciences of the U.S. Department of Education and is congressionally mandated. It provides data for a variety of subjects at the 4th, 8th and 12th grades based on representative samples of students. Using NAEP scores provides consistency and enables valid comparisons between states.

## Statement of the Research Problem

The current financial state of our nation has produced a situation where all levels of government have to make difficult decisions regarding expenditures. While states are operating under fiscal stress, legislation, such as the No Child Left Behind Act (NCLB), holds states accountable to ensure that high quality education is available to all students

using state standards and state assessments (Public Law 107-110, 2002). A call for better prepared 21st century learners is also occurring to ensure that U.S. citizens can compete in the global economy. Now more than ever, it is critical to show evidence of a correlation between state expenditures towards education and student outcomes. Understanding the impact of educational funding and the return on investment is crucial when making funding decisions (Owings & Kaplan, 2006)

## The Purpose and Research Question

The purpose of this research is to examine the association between fiscal effort and student outcomes over time. The intent is to add to the current literature by examining the long-term effects of sustained increased slope and decreased slope of fiscal effort on student achievement according to math scores on the NAEP. The following question will be used to guide this study:

- How do sustained increases and decreases in state fiscal effort over time predict student performance outcomes on math NAEP scores for 4th and 8th grade students?

## Overview of Methodology

This study is both descriptive and correlational. The study examines the fiscal effort and math NAEP scores of all 50 states and the District of Columbia over an eighteen year period: 1992-2009. Quantitative methods, more specifically, will be used to address the research question. The specific type of *HLM* used is a heriarchical multivariate linear model (*HMLM*). This approach is appropriate because all data are at the same level (state level). In addition, the data are nested within a state over time (Raudenbush & Bryk, 2002).

The target of this study is the fifty states and the District of Columbia. A specific value of fiscal effort was computed for each state. Data for this computation was derived from a data base of state fiscal effort calculated by the following formula: E=R/TB where E is fiscal effort, R is the amount of money spent for education per pupil K-12 for the state and TB is the measure of wealth determined by the Gross State Product (GSP) on a per capita basis (Owings & Kaplan, 2006). GSP figures are used as they provide control for variances in the economy.

All data used in this study are pre-existing and available to the public. The following is a list of sources used for this study:

- U.S. Department of Commerce Bureau of Economic Analysis,
- The Digest of Education Statistics 2008,
- The Education Finance Statistic Center (EDFIN) Longitudinal data, and
- NAEP data from 1990-2009.

NAEP uses a sample of the population to ensure that the students selected to participate are representative of the geographical, racial, ethnic, and socioeconomic diversity of schools throughout the United States. The first level of the selection to ensure a representative sample of schools throughout the nation utilizes the following characteristics: location, minority enrollment, level of school achievement, and average income. Once schools are selected, students within the schools are randomly chosen to participate. Approximately 9,000 students in about 100 schools are included for each subject area (U. S. Department of Education, 2009).

## Overview of the Study

This study is organized into five chapters. Chapter one includes the following: a description of public funding for education at a federal and state level, the significance of the study, the statement of the research problem, the purpose and research question, implications for educational leadership, implications for social justice, and an overview of the methodology. Chapter two provides a review of the literature associated with educational expenditures and student achievement. This chapter contains major studies that describe the debate regarding the relationship between funding and student achievement and additional studies that attempt to support claims on both sides of the debate. Chapter three contains a description of the methods utilized in the study. The results of the analysis are described in chapter four. The study concludes with a discussion of the findings and suggestions for further research.

# CHAPTER 2

## A Review of the Literature

This literature review reflects the current information available on the topic of funding and student achievement. The synthesis begins with a brief description of reports, legislation, and litigation focused on the relationship between funding and student achievement. The conceptual framework upon which this study is built is explained before delving into the major studies that highlight the controversy between funding and student achievement. The debate is further examined through the explanation of additional studies that vary in focus and perspective. An examination of studies that have used NAEP scores as indicators of student achievement is then provided to support the validity of this assessment measure. Finally, fiscal effort is explained as a predictor in the study, and the literature review ends with the research question and hypothesis.

## Introduction

Research regarding the relationship between school funding and student achievement has been a disputed topic for decades. Many research studies have been completed in an attempt to determine a relationship between the two variables; the results of the studies have been conflicting. While some researchers report a positive relationship between school funding and student achievement, other researchers report no relationship or a negative relationship. At this time, there is a lack of consistent evidence regarding the relationship between funding and academic achievement (Lips, Watkins, & Fleming, 2008). The controversy has been heightened by several factors including critical reports of educational practices released over the years, pressure from the federal

government regarding student achievement, and litigation regarding fiscal equity in education.

Several reports have been released over the years that have called attention to education policy and practice with an emphasis on funding. The Equality of Educational Opportunity, also referred to as the Coleman Report (1966), was released following the Civil Rights Act of 1964. The purpose of the study was to examine the distribution of education resources by race or ethnic background. Data from nearly 650,000 students, teachers, and administrators from over 3,000 schools were included in the study (Coleman, et. al, 1966). The study became a huge statistical base of information. The findings from the Coleman Report indicated that school inputs had little to no influence on student achievement (Hanushek, 1996). This report marked the beginning of the controversy regarding the relationship between funding and student achievement.

The publication of A Nation at Risk (U. S. Department of Education, 1983) was commissioned by the U.S Secretary of Education, T. H. Bell, to evaluate the United States' educational system. The loss of American dominance in international commerce, industry, and technology resulted in the commission which reported that American schools were failing in comparison with their international counterparts. The report initiated a standards-based reform movement in the United States which marked a shift in the focus of education policy from inputs, like school funding, to outputs, like student achievement (Lee & Wong, 2004). This resulted in a situation where states improved performance standards and implemented high-stakes tests to measure and improve the quality of education (Lee & Wong, 2004). The follow-up report to A Nation at Risk, A Nation Accountable: Twenty-five Years after a Nation at Risk (2008), highlighted that

the national per-pupil expenditure has nearly doubled since 1983 while test scores on the NAEP have remained stable. For example, six out of twenty students born in 1983 were proficient in reading and four were proficient in math by the fourth grade. In 1997, seven out of twenty students were proficient in reading and eight were proficient in math by the fourth grade (U. S. Department of Education, 2008). While some improvements are demonstrated in math, reading achievement has remained relatively stagnant. These reports highlight the intense focus of education policy and practice directly related to funding.

In addition to reports, federal legislation, such as the No Child Left Behind Act (NCLB), has influenced policy and practice and called attention to funding. NCLB requires all states to have standards and an assessment system in place in order to ensure a high quality education for all students (Public Law 107-110). It is important to note that due to the lack of a national curriculum, individual states have developed their own standards and assessments. NCLB requires states to meet Annual Yearly Progress (AYP) benchmarks in specified sub-groups: economically disadvantaged, special education, limited English proficiency, and major racial/ethnic groups (Public Law 107-110). Accountability testing identified achievement gaps which highlighted inequities apparent in public education (Scheurich & Skrla, 2003). Schools servicing predominantly minority students receive less funding than schools servicing predominantly white students which results in increased disadvantages for minority students over the years (Darling-Hammond, 2006). Legislation has not only put an emphasis on funding; it has also highlighted inequities among students.

Beginning in the 1970's, school finance litigation has been filed in nearly every state with a focus on equity issues (Lefkowits, 2004). One example is the California case of Serrano v. Priest. In this case, the California Supreme Court determined the state's method of funding schools was unconstitutional. The method relied on property taxes to generate revenue. The revenue of school districts varied depending on the wealth of the districts. Due to the state constitution's guarantee of equal protection under the law, it was deemed unconstitutional (Alexander & Alexander, 2009). The Rose v. Council for Better Education in Kentucky is another example. The entire school system was deemed unconstitutional and inadequate by the Supreme Court. The school system was described as "underfunded and inadequate" with large variation in financial resources resulting in unequal opportunities for students (Alexander & Alexander, 2009, p. 1086). It was noted that expert opinions clearly established a correlation between achievement test scores and wealth of districts (Alexander & Alexander, 2009). The fervent interest in educational funding and student outcomes, fueled by the reports, legislation, and litigation released, demonstrates the necessity to identify valid correlations between funding and student achievement.

This study addresses the controversial question, "Is there a relationship between school funding as measured by state fiscal effort and student achievement?" The intent is to determine a relationship between school funding and student achievement using specific variables and sophisticated quantitative analysis. This study will examine the relationship between state fiscal effort and student achievement as measured by math scores from the National Assessment of Educational Progress (NAEP) over eighteen years.

## Theoretical Framework

The majority of education finance studies examining the relationship between educational funding and student achievement have utilized production function methods, input-output or cost-quality studies (Hedges, Laine, and Greenwald, 1994). The production function model is often used in industry studies; however, modifications are made to sufficiently address educational needs (Hanushek, 1986). For example, modifications are made to adjust policy issues and measurement variables. The production function model attempts to analyze the relationship between certain inputs and outcomes regarding the educational process. These studies are not experimental; they rely on econometric methods to isolate specific factors that influence student performance using a systematic, quantitative investigation. The intent is to implement quantitative methods that permit researchers to predict the effect of a specific input on student outcomes/outputs. The Coleman Report (1966) is one of the most well-known examples of the production function model. Numerous other studies have used the production function method as well; however, the guidelines are broad and no consensus has been reached regarding specification of the model (Hedges, Laine, and Greenwald, 1994).

This study utilizes the production function method with fiscal effort and NAEP scores as variables. The specific quantitative method used is hierarchical multivariate linear modeling (*HMLM*). *HMLM* is an advanced statistical methodology that provides a statistical model for examining the relationship between variables that cross levels of analysis (Hofmann, Griffin, & Gavin, 2000). The conceptual model for this study includes each state and the state's percentage of students eligible for free and reduced

price lunch (FRPL). Fiscal effort is the input. Fiscal effort demonstrates a state's contribution to education in relation to the state's wealth which provides a different perspective than the use of per pupil expenditures as used in many other studies. The change in fiscal effort is examined over an eighteen year period. This study emphasizes the relationship between fiscal effort and NAEP scores over time due to research indicating that it takes five to seven years to make systemic changes in educational settings (Berman & McLaughlin, 1978). While outcomes from innovations are visible after five to eight years, they are fragile (Fullan, 2000). A change in leadership or direction can easily alter the effect of the innovation. The math NAEP scores are used as the output. Scores from the NAEP are used to measure student achievement because the NAEP is the first national assessment that provides the opportunity for states to gauge the quality of their education and compare it to other states (Ginsburg, Noell, & Plisko, 1988). The use of NAEP scores improves current statistics by offering a common measuring tool for all states (Ginsburg, Noell, & Plisko). Figure 4 is a representation of the theoretical framework for this study.

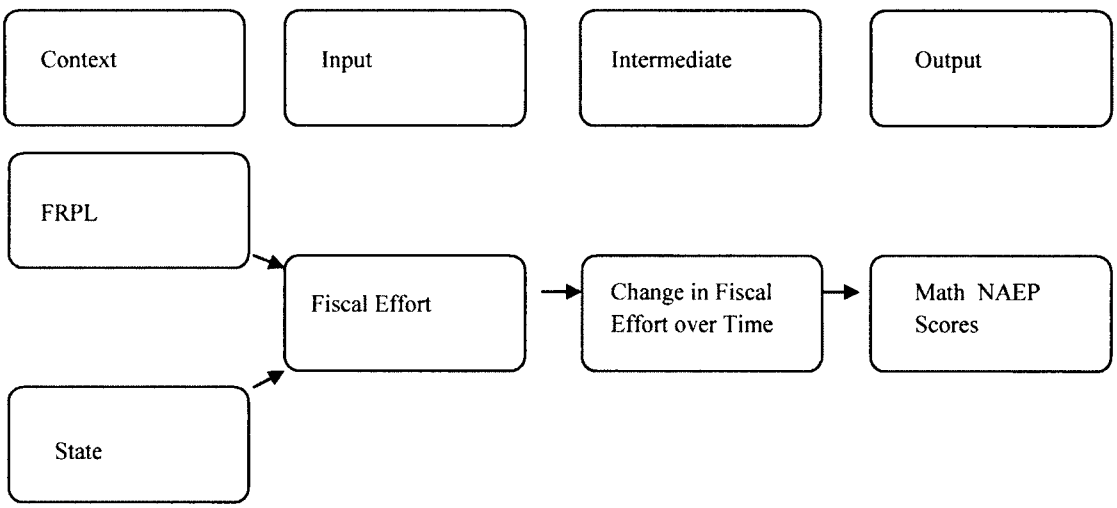



*Figure 4.* Theoretical framework of state fiscal effort on math NAEP scores.

Education is a state's single largest expenditure comprising nearly 21 percent of its budget (National Governors Association, 2010). The acknowledgment of the return on investment that education provides through individual and social returns to the state is the rationale for the spending (Alexander, 2001). This study further examines the relationship between spending and student achievement by analyzing the relationship between fiscal effort and NAEP scores over time. The longitudinal analysis conducted through *HMLM* improves the validity of comparisons in student outcomes and educational funding compared to other studies.

## Funding and Student Achievement: The Debate

Many studies have been completed regarding the topic of funding and student achievement; however, as mentioned previously, the results have not been consistent. While some studies conclude that a positive relationship exists between the level of funding and student achievement, others report no relationship exists between the level of funding and student achievement. The studies have varied greatly from differences in the focus of the studies to the perspectives of the studies. The common thread in the studies is the goal to determine the presence or lack of a relationship between educational funding and student outcomes. The studies can be grouped into two categories: studies reporting no relationship between spending and achievement and studies reporting a positive relationship between spending and achievement. The following is a summary of studies in both categories.

### Studies Reporting No Relationship between Spending and Achievement

Researchers Coleman et al. (1966), Hanushek (1986), and LeFevre and Hederman (2001) have published major studies, often cited in literature concerning the debate,

which report no significant relationship between spending and student achievement. The beginning of this debate can be traced back to the release of the Coleman Report (1966).

Mandated by the Civil Rights Act of 1964, the Coleman report was commissioned to analyze the distribution of educational resources by race, religion, or national origin (Coleman et. al, 1966). It became an immense statistical base, including information for over a half million students in approximately 3,000 schools, to determine associations between inputs in the educational process and outputs. The Coleman Report is not only the best known study of this kind but, also, the most controversial (Hanushek, 1986). In general, findings from the Coleman report demonstrated no relationship between inputs, such as differences in schools and student achievement. Factors such as family background, however, did demonstrate an association with student achievement. It is important to note that since the release of the report the methodologies and findings of the report have been criticized by researchers. Claims have been made that the Coleman Report has such severe methodological shortcomings that the data should not be used for policy decisions due to the loose theoretical framework employed and the flawed interpretation of results (Cain & Watts, 1968). Despite the controversy surrounding it, the Coleman Report is referenced in many subsequent studies and the lens through which findings are interpreted.

Eric Hanushek (1986) completed a study which examined the effect of specific expenditures on student achievement. Hanushek's study employed a vote-counting method where results of previous studies were tabulated and categorized according to the sign and statistical significance. The category with the most results was identified as the findings for the relation. Hanushek found varying results between specific factors and

student outcomes. In analyzing basic expenditures, Hanushek explained that teacher salaries and class size comprised two-thirds of school expenditures. He reported class size, teacher education, and teacher experience did not affect student achievement. He reported that the analysis of other expenditures, such as per-pupil spending, did show a positive correlation; however, the correlation disappeared when family background was controlled. Socio-demographic characteristics, such as parent education, income, and family size, were described as examples of measurements for family inputs in Hanushek's study. However, limitations are present in Hanushek's work. The vote-counting method used has low power as a predictor and is prone to Type II errors. Due to the fact that student achievement is a product of years of development, the research which was focused within a short period of time is a serious limitation (Berman & McLaughlin, 1978). Hanushek (1996, 1997) has since reported no relationship or a weak and inconsistent relationship between education expenditures and academic achievement.

Supporting the findings of Coleman (1966) and Hanushek (1986), researchers, LeFevre & Hederman (2001) released a report finding no correlation between state expenditure and student achievement. They asserted that pupil to teacher ratio, creating more schools, and providing more funding will not improve student achievement. They highlighted these findings by demonstrating increases in SAT scores for three states that have not experienced increases in funding. The quantitative analysis used in this study was ordinary least squared regression (OLS). The inputs were measured as a group and individually to determine the findings. The study did not consider whether individual state expenditures towards education were increasing, decreasing, or remaining the same

over time which would have increased the validity of the results considering the time it takes for systemic change to show in student outcomes (Berman & McLaughlin, 1978).

The studies described reporting no relationship between spending and student achievement have some commonalities and differences. All of the studies utilized a production function approach. However, each study used different quantitative methods to determine a relationship. Different inputs and outputs were identified and measured in each study. Coleman and Hanushek used data from a short time span which is a serious limitation considering that it takes time for innovations to be measured once they are implemented (Berman & McLaughlin, 1978). None of the studies examined the educational funding over time in specific states to determine sustained increase, sustained decrease, or consistency. This study examines data spanning eighteen years to determine the effects of sustained increases or decreases in fiscal effort on student achievement over time. The use of the *HLM* allows for analysis of nested data over time while controlling for FRPL (Hoffman, Griffin, & Gavin, 2000).

**Studies Reporting a Positive Relationship between Spending and Achievement**

Unlike the studies described earlier, Hedges and Greenwald (1996), Flanigan, Marion, and Richardson (1996), Verstegan and King (1998), and Okpala (2002) conducted studies reporting a positive relationship between spending and student achievement. Some studies accentuate the debate by reanalyzing the work of earlier studies.

Using the same data Hanushek (1996) used, researchers Hedges, Laine and Greenwald (1994) asserted that increased per-pupil expenditure did significantly impact student achievement. These findings are a complete contradiction of Hanushek's

findings. The limitations of vote-counting methods, specifically the increased likelihood of Type II errors and the low power as a predictor, were identified by the researchers. They utilized combined significance tests, chi-square, and combined estimation methods for their meta-analysis. Their reanalysis suggested that increasing spending will increase student achievement. They do note limitations in the data, such as the lack of longitudinal data, as a weakness. Hedges et al. emphasized that further research in determining relationships between inputs and outputs and determining the best allocation of resources in certain contexts is necessary.

A meta-analysis describing thirty-five years of data was conducted by Verstegen and King (1998). They concluded that teacher characteristics, class size, and classroom resources were positive indices of student achievement. They also emphasized the fact that improvements in statistical methods used to analyze the data influenced the identification of positive relationships between school funding and student achievement. They suggested the use of longitudinal data rather than achievement measured at one point in time for further research in order to strengthen the validity of the relationship between spending and student achievement.

In an effort to examine the relationship over time, an analysis of South Carolina public schools educational spending and student achievement was conducted by Flanigan, Marion, and Richardson (1996) over a period of seven years. South Carolina public schools experienced increased educational funding for the first four years of the seven years examined. Following the fourth year, the funding dwindled. The findings of their study showed the impact of schooling, determined by the percentage of teachers holding advanced degrees, on student achievement was minimal during the first two

years; however, it significantly increased during the third and fourth year. During the fifth and sixth year, student achievement decreased paralleling the decrease in educational funding. These findings suggest a relationship between funding and student achievement over time. This demonstrates the importance of long term analysis of funding and student achievement.

Like the studies demonstrating no relationship between spending and student achievement, the studies that report a positive relationship also vary in focus and methodology. Again, the need for a longitudinal study is emphasized for further investigation of the relationship. This study adds to the current literature by providing an examination of data over an eighteen year period.

While major studies have been described in this section, which demonstrate the debate regarding the relationship of spending and student achievement, numerous studies have been conducted following these studies in attempts to determine a strong and valid relationship between spending and student achievement. These studies have varied greatly in focus and perspectives.

## Spending Practices and Achievement

Current research has built upon the foundation of the major studies. It can be said that certain variables do impact student achievement. Researchers are attempting to identify variables that predict student achievement. The studies tend to focus on specific variables, such as class size reduction, and their effects on student achievement. Due to advancements in methodologies and measurements, different quantitative analyses have been employed.

Following the same pattern as the major studies, conflicting findings are reported in these studies, as well. An interesting study conducted by Ilon and Normore (2006) examined class size reduction in elementary schools in Florida. The study used scores from the Florida Comprehensive Assessment Test (FCAT) as a measure of student achievement. The study concluded that class size reduction does positively impact student achievement. While the researchers report the positive relationship, they emphasize that class size reduction is not the most cost effective use of resources. Unlike the previous study, Okpala (2002) examined the relationship between total educational resources and student achievement in math and reading in a particular low-wealth school district in North Carolina over a three year time period and reported no relationship between educational resources and student achievement. Okpala used OLS regression and suggested improving upon the study by utilizing *HLM* as the methodology in further research.

Following Okpala, some studies were conducted using *HLM*. A two-level *HLM* developed by Raudenbush and Bryk (2002) was used by Smith (2004) to analyze the effect of educational spending on student outcome based on the Minnesota Basic Skills Test (MBST) for eighth grade mathematics and reading. The study found that average teacher salaries and per pupil spending for instructional support services positively influence math and reading scores. Archibald's (2006) study used a more comprehensive model than the previous research, a three-level, hierarchical linear model created by Bryk and Raudenbush (2002). Archibald (2006) examined school spending for instruction, support, leadership and operations regarding their effect on student achievement. Data from elementary schools in Washoe County, Nevada were used in this study. The fiscal

data were separated into four categories: instruction, instructional support, leadership, and operations. The study concluded that per-pupil spending at the school level is positively related and statistically significant to student achievement in reading. Both studies did identify a positive relationship between spending and student achievement. The use of an advanced statistical method improves the literature; however, the short time frame of both studies is a limitation. Analyzing the effect of spending longitudinally is necessary for strong generalizability and improved literature.

**Student Achievement: NAEP**

Student achievement has been identified by different indicators, such as local or state assessments, in many of the studies. In order to compare achievement across states, a common instrument is necessary. A major limitation in the study of educational outcomes has been collecting data necessary to examine change over time across states (Swanson & Stevenson, 2002). NAEP scores are a common measure of assessment that provide a source for statistically valid measures of achievement of representative samples of students nationally. NAEP scores have been used in some current studies attempting to compare spending and student outcome among states. Continuing with the pattern of other studies, some of the studies report no relationship between spending and student achievement while others do. Lips, Watkins, & Fleming (2008) reported an increase in federal funding since 1970 that has not been followed by gains in achievement. They failed to consider the factors that contributed to the increase in federal spending, such as Public Law 94-142, the Education for All Handicapped Children Act, which was enacted by Congress in 1975. The law provides a free and appropriate education for all students with disabilities. Another significant factor was the No Child Left Behind Act (NCLB),

the reauthorization of the ESEA in 2002, which requires states to have standards and an assessment system to ensure a high quality education for all students (Public Law 107-110). In addition to legislation, K-12 public school enrollment has increased from 36.1 million in 1960 to 51.6 million students in 2008 (Snyder & Dillow, 2010). The researchers asserted that continuous spending has not corresponded with improvement in educational performance using NAEP scores and graduation rates as outcomes. The researchers reported funding, NAEP scores, and graduation rates as national averages. The determination that no relationship between spending and student achievement exists was based on broad national averages. Considering individual state trends in educational spending over time in relation to the state's NAEP scores would show a stronger correlation between spending and achievement.

Other researchers have examined the relationship between spending and student achievement using NAEP scores and have reported a relationship between the two. NAEP assessment scores are divided into three levels of achievement: basic, proficient, and advanced. Cutoff scores for each achievement level are different depending on the grade level and subject of the assessment. Spending was determined to account for one-third of the variation in math NAEP proficiency achievement scores according to Verstegen (1994). The amount of spending was significantly related to proficiency scores but not basic achievement scores (Verstegen, 1994).

Because of its strength as a valid measure to compare student achievement across states, NAEP scores have been used in other finance studies that do not have a direct focus on spending and student achievement; however, they do consider information between the two. Many finance studies investigating the effect of reform and student

achievement utilize NAEP scores and provide information regarding funding and student achievement. Shifts in resources resulting from statewide reforms account for a small part of gains in NAEP scores (Grissmer & Flanagan, 2001). The need for analysis of longitudinal data was presented by the researchers. A separate study examining the impact of accountability on racial and socioeconomic equity used NAEP scores as an outcome variable. The study showed school resources to be significantly associated to math achievement according to NAEP scores (Lee & Wong, 2004). Furthermore, the study also revealed a significant relationship between school resources and changes in the Hispanic-White achievement gap (Lee & Wong, 2004). The use of NAEP scores strengthens the validity of cross-state comparisons and is utilized in many studies. The use of NAEP scores as indicators of student achievement, when examining the effect of spending on student achievement, adds to the current literature. While NAEP scores strengthen the study by increasing validity as an outcome variable, fiscal effort provides a unique perspective as the input variable.

**Fiscal Effort over Time**

As noted in the studies discussed above, different input variables have been examined to determine a relationship between spending and student achievement. The use of per pupil expenditures does not provide a clear picture of a state's contribution toward education. The capacity of states varies across our nation. Utilizing fiscal effort adds to the current literature by providing a unique perspective to funding. Fiscal effort takes into consideration the state's capacity by using a ratio of total per pupil expenditure and a measure of state wealth comprised of the Gross State Product (GSP) on a per capita basis (Owings & Kaplan, 2006). Consequently, a state with a greater per pupil

expenditure may actually be contributing less monetary effort than a state with a lower per pupil expenditure (Goldschmidt & Eyermann, 1999). For example, in 1988 Florida and California had very similar per-pupil expenditures, $3,600.00 and $3,700.00. When capacity is considered, the picture is very different. Florida expenditure comprised 21% of the state's GSP while California expenditure comprised 15% of the state's GSP. Florida exerted greater effort towards education than California. A state's fiscal status has an impact on all state services, including public education (Adams, 1983). States with greater fiscal capacity are in a better situation to provide necessary funding; however, states with less fiscal capacity may devote a greater percentage to education by implementing cutbacks in other areas (Adams, 1983).

Fiscal effort is an indicator of how much each particular state invests in education (Goldschmidt & Eyermann, 1999 & Owings & Kaplan, 2006). States that spend a greater percentage of their wealth on education demonstrate that education is a priority. This perspective is important when one considers that as state per pupil expenditures have increased over time, total state contributions in relation to the overall budget have remained consistent over the past twenty years at nearly twenty-two percent (Murray, Rueben, & Rosenberg, 2007).

To further illustrate this point, consider that all regions of the Unites States demonstrated increases in education spending between 1980 and 1990; however, the variations among states ranged from losses of six percent to gains of 90 percent (Verstegen, 1994). Acknowledging the regional data without a closer look at individual states gives a skewed view of educational spending. Verstegen examined several studies that used data from the year 1990 to determine if school resources affect student

achievement. Verstegen noted the importance of fiscal effort throughout her work. Based on her research, Verstegen (1994) asserted that a link exits between a state's fiscal capacity for education and quality of education.

This study enhances the current literature by being the only study to focus on the effect of sustained increased and decreased fiscal effort on student achievement according to math NAEP scores over an eighteen year period. Gaps in the existing literature demonstrated the importance for a study of this kind. The longitudinal analysis of data has been suggested by several researchers. In order to truly see the implications of initiatives, such as funding, data must be examined over time (Hanushek, 1986; Berman & McLaughlin, 1978). The validity of NAEP scores has been described throughout this study. Because comparisons are being made between states, NAEP scores are the only valid measure to demonstrate student achievement. Fiscal effort is an indicator of how each particular state values education. States that spend a greater percentage of their wealth on education demonstrate that education is a priority. By examining sustained increases and decreases in fiscal effort over time, this study provides a unique perspective to the current literature. For the first time, the indicators demonstrate how much each state values education and the effect this value has on student achievement.

## Research Question and Hypothesis

The purpose of this research was to examine the association between state fiscal effort and student outcomes over time. The study examined the long-term effects of sustained increased slope and decreased slope of fiscal effort on student achievement according to math scores on the NAEP. The following question was addressed:

- How do sustained increases and decreases in state fiscal effort over time predict student performance outcomes on math NAEP scores for $4^{th}$ and $8^{th}$ grade students?

**Hypothesis**

States with sustained increases in fiscal effort over time will observe improvement in student performance on math NAEP scores over time. States with sustained decreases in fiscal effort over time will observe no improvement in student performance or a decline in student performance on math NAEP scores over time.

# CHAPTER 3

## Methodology

The purpose of this correlational study was to determine if a relationship existed between state fiscal effort and student achievement as measured by math scores on the National Assessment of Educational Progress (NAEP) over an eighteen year period. This correlational study used pre-existing data rather than data collected from a controlled experimental design. In educational settings, it is often impractical to use an experimental design. In some instances, it is unethical or immoral (Lord, 1973). For example, consider a study examining the relationship between funding and student achievement. It would not be considered appropriate to deprive a group of students of resources in order to determine what the results would be on their achievement compared to students who received adequate resources. In cases where potential issues of ethics or morals are in question, it is appropriate to examine variables that have occurred naturally, such as examining the relationship between the naturally occurring fiscal effort of a state and student achievement. Because we examined the degree to which the variables of fiscal effort and student achievement move with respect to each other over time, this study is correlational (Lord, 1973).

Both the independent variable and the dependent variable in this study are pre-existing. The dependent variables are math scores from the NAEP for all states who participated in the assessment for the years it was administered from 1992 to 2009. The beginning date of 1992 was selected because it was the first year scores for both $4^{th}$ and $8^{th}$ grade math NAEP assessments were available. The data collection ends in 2009 because it was the final year all necessary data were available for all variables. The

independent variable is the state fiscal effort calculated for each year and each state for the time period examined. The specific quantitative method used for this study is hierarchical multivariate linear model (*HMLM*) developed by Raudenbush and Bryk (2002).

The methodology of this study is explained throughout this chapter. The chapter begins with a description of the sample and variables. Following this information, the chapter provides a rationale for the proposed study design. An explanation of the data collection methods and data analysis procedures are provided before discussing the strengths and limitations of this study.

## Sample

The sample for this study is the 50 states and the District of Columbia. The dependent variables used in this study are $4^{th}$ and $8^{th}$ grade math scores from the NAEP assessment. For that variable, the participants are students who took part in the NAEP assessments from 1992 to 2009. The NAEP is administered by states on a voluntary basis. The No Child Left Behind Act (2001) has encouraged states to participate in the math and reading NAEP assessments by making participation in the assessment a criterion for receiving federal Title I funding (U. S. Department of Education, 2009). Table 1 shows the participating states for each year the math NAEP assessment was administered.

Table 1

*States Participating in the Math NAEP Assessments*

| States | Years Administered | | | | | | |
|---|---|---|---|---|---|---|---|
| | 2009 | 2007 | 2005 | 2003 | 2000 | 1996 | 1992 |
| Alabama | x | x | x | x | x | x | x |
| Alaska | x | x | x | x | | x | |
| Arizona | x | x | x | x | x | x | x |
| Arkansas | x | x | x | x | x | x | x |
| California | x | x | x | x | x | x | x |
| Colorado | x | x | x | x | | | x |
| Connecticut | x | x | x | x | x | x | x |
| Delaware | x | x | x | x | | | x |
| District of Columbia | x | x | x | x | x | x | x |
| Florida | x | x | x | x | | | x |
| Georgia | x | x | x | x | x | x | x |
| Hawaii | x | x | x | x | x | x | x |
| Idaho | x | x | x | x | x | | x |
| Illinois | x | x | x | x | x | | |
| Indiana | x | x | x | x | x | x | x |
| Iowa | x | x | x | x | x | x | x |
| Kansas | x | x | x | x | x | | |
| Kentucky | x | x | x | x | x | x | x |
| Louisiana | x | x | x | x | x | x | x |
| Maine | x | x | x | x | x | x | x |
| Maryland | x | x | x | x | x | x | x |
| Massachusetts | x | x | x | x | x | x | x |
| Michigan | x | x | x | x | x | x | x |

Table 1 Continued

| States | Years Administered | | | | | | |
|---|---|---|---|---|---|---|---|
| | 2009 | 2007 | 2005 | 2003 | 2000 | 1996 | 1992 |
| Minnesota | x | x | x | x | x | x | x |
| Mississippi | x | x | x | x | x | x | x |
| Missouri | x | x | x | x | x | x | x |
| Montana | x | x | x | x | x | x | |
| Nebraska | x | x | x | x | x | x | x |
| Nevada | x | x | x | x | x | x | |
| New Hampshire | x | x | x | x | | | x |
| New Jersey | x | x | x | x | x | x | x |
| New Mexico | x | x | x | x | x | x | x |
| New York | x | x | x | x | x | x | x |
| North Carolina | x | x | x | x | x | x | x |
| North Dakota | x | x | x | x | x | x | x |
| Ohio | x | x | x | x | x | | x |
| Oklahoma | x | x | x | x | x | | x |
| Oregon | x | x | x | x | x | x | |
| Pennsylvania | x | x | x | x | | x | x |
| Rhode Island | x | x | x | x | x | x | x |
| South Carolina | x | x | x | x | x | x | x |
| South Dakota | x | x | x | x | | | |
| Tennessee | x | x | x | x | x | x | x |
| Texas | x | x | x | x | x | x | x |
| Utah | x | x | x | x | x | x | x |
| Vermont | x | x | x | x | x | x | |
| Washington | x | x | x | x | | x | |

Table 1 Continued

| States | Years Administered | | | | | | |
|---|---|---|---|---|---|---|---|
| | 2009 | 2007 | 2005 | 2003 | 2000 | 1996 | 1992 |
| West Virginia | x | x | x | x | x | x | x |
| Wisconsin | x | x | x | x | | x | x |
| Wyoming | x | x | x | x | x | x | x |

From U.S. Department of Education, National Center for Education Statistics, *NAEP Data Explorer.*

The NAEP is designed to report scores which represent the performance of large samples of students, not individuals (U. S. Department of Education, 2009). Samples are selected to ensure that properties of specific populations are investigated. Three to four million children are enrolled in each grade in the United States. Nearly four percent of these students are sampled at each tested grade level (160,000 students). Even though a relatively small number of students is sampled, the sample is representative of the population due to the procedures utilized for sampling. Stratification, a system of classifying based on similar attributes, is used to select samples. Schools are stratified by, "extent of urbanization, percentage of minority enrollment, median household income, or state achievement test results" (U. S. Department of Education, 2009, p. 14). In an effort to accurately represent major student groups, the technique of oversampling is used. Oversampling is including a particular type of school at a higher rate than it actually occurs in the population. However, care is taken to ensure that the data from the oversampling are properly weighted. Weighting also compensates for low sampling rates. The sampling techniques guarantee that the results demonstrate the representative performance of students.

## Variables

This study answers the following question; how do sustained increases and decreases in state fiscal effort over time predict student performance outcomes on math NAEP scores for 4th and 8th grade students? The following are descriptions of each variable used in this study.

### Fiscal Effort

Utilizing fiscal effort adds a unique perspective to the research examining the relationship between funding and student achievement. A common independent variable used in most studies is per pupil expenditures. The use of per pupil expenditures does not provide a clear picture of a state's contribution toward education. The capacity of states varies across the nation. Fiscal effort takes into consideration a state's capacity by using a ratio of total per pupil expenditure and a measure of state wealth comprised of the Gross State Product (GSP) on a per capita basis (Owings & Kaplan, 2006). While GSP at times may be a lagging indicator, it does reflect economic conditions and tends to be reflective of the state's economy over time. This calculation is represented by the following formula: E=R/TB where E is fiscal effort, R is the amount of money spent for elementary and secondary education per pupil for the state and TB is the measure of wealth determined by the GSP on a per capita basis (Owings & Kaplan, 2006). In other words, fiscal effort shows how much of a state's capacity is being put toward education. Consequently, a state with a greater per pupil expenditure may actually be exerting less fiscal effort than a state with a lower per pupil expenditure (Goldschmidt & Eyermann, 1999). While a state's fiscal status has an impact on all state services, including public

education, each state determines how much of its money it invests in education or, in other words, how much the state values education (Adams, 1983).

While fiscal effort provides a unique perspective for this examination, it is important to have a clear understanding of this variable. State fiscal effort shows an average of the state's contribution towards education in relation to GSP on a per capita basis. As noted earlier, funding for education is provided primarily by state and local funding. When localities experience higher levels of wealth determined by the tax base, the state reduces the amount of funding while the locality increases the amount of funding. Fiscal effort does not take this into consideration.

**NAEP**

NAEP is a system of common assessments that is implemented across the United States to measure student achievement. It is commonly referred to as "The Nation's Report Card" (U. S. Department of Education, 2009). It is the first common measure of assessment that provides a source for statistically valid measures of achievement of representative samples of students nationally (Grissmer & Flanagan, 2001). The lack of a national curriculum has led individual states to develop their own standards and assessments. Therefore, using specific state assessments would not provide valid data for cross-state comparisons. The NAEP provides data that can be used for comparative state analysis. NAEP is administered by the National Center for Education Statistics (NCES) as part of the Institute of Education Sciences of the U.S. Department of Education and is congressionally mandated.

NAEP is comprised of two components: the main NAEP and the long-term trend NAEP. The main NAEP reports data at the state and national level. The long-term trend

NAEP is only implemented at the national level and with less frequency than the main NAEP. The main NAEP is administered bi-annually. Because state level data are necessary for this study, the main NAEP is utilized. The main NAEP provides data for reading, writing, science and math at the 4th, 8th and 12th grades based on representative samples of students. Only data from math assessments are used in this study. The math assessments include multiple choice and constructed-response questions to measure student achievement (U. S. Department of Education, 2009). Scores for both the 4th and 8th grade math assessment are reported using a 0 to 500 scale (U. S. Department of Education, *NAEP Data*, 2011). NAEP assessment scores are broken down into three achievement levels: basic, proficient, and advanced. The achievement level cut scores are different for each assessment. The 4th grade cut scores are 214 for basic, 249 for proficient, and 282 for advanced. The 8th grade cut scores are 262 for basic, 299 for proficient, and 333 for advanced. Using NAEP scores provides consistency and enables valid comparisons between states.

**FRPL**

Free or Reduced Price Lunch (FRPL) is the percentage of students eligible to receive free or reduced price lunch. The National Center for Education Statistics reports state percentages of FRPL annually. Data from the National Center for Education Statistics was used to calculate a mean score for each state. The mean FRPL for each state is used as an indicator of state poverty level.

## Study Design

As described earlier, this study is a correlational study. The examination of the variables of fiscal effort and student achievement, as they vary with respect to each other

over time, makes this a correlational study. In order to explore these variables, the state data are observed at specific times from 1992 to 2009 regarding math assessment data. Because state data, fiscal effort, and NAEP scores, are examined over time within each state, the data are hierarchical or nested within the states. When this situation of nested data occurs, specific methodological approaches are necessary. Several methods are capable of handling this type of study; however, the assumptions associated with them are laborious (Osborne, 2008). Using hierarchical linear modeling (*HLM*) requires a smaller number of assumptions and considers the fact that the data are nested. *HLM* operates in levels of analysis. The lowest level of the analysis is referred to as level 1. In level 1, "an outcome variable is predicted as a function of a linear combination of one or more Level 1 variables, plus an intercept" (Osborne, 2008 p. 447). The slope and intercept estimates derived from the level 1 analysis are used as dependent variables in the level 2 analysis (Hoffman, Griffin, and Gavin, 2000).

In this study, state fiscal effort is observed over time in relation to the student outcome variables of math scores from the NAEP. Math NAEP scores are not available for all states for every year observed. This leads to a situation of missing data and uneven years of data. While other methodological approaches can handle these situations, it is difficult to meet the numerous statistical assumptions necessary to complete the analyses. *HLM* is a more effective model to use because it can deal with missing data and unequal time intervals. Because *HLM* produces smaller standard error when models are created correctly, it is the most appropriate method for analysis of longitudinal data (Osborne, 2008). The specific *HLM* used in this study is the hierarchical multivariate linear model (*HMLM*). An *HMLM* is appropriate because data

for this study are limited to the state level. Moreover, the repeated state data over time is nested within each state resulting in a situation where *HMLM* is the most appropriate model.

## Data Collection

All data for this study are pre-existing and available to the public. The National Center for Education Statistics (NCES) as part of the Institute of Education Sciences of the U.S. Department of Education provides public access for all NAEP scores at http://nces.ed.gov/nationsreportcard/about/. The website provides a tool, the NAEP Data Explorer, to locate, organize, and compare assessment information for each NAEP assessment. Specific websites are available for all NAEP scores. This website was used to compile math NAEP scores for all states and the District of Columbia who participated in the assessment from 1992 to 2009.

Fiscal effort was calculated for all 50 states and the District of Columbia using publicly available data collected in a 35 year data base by William Owings and Leslie Kaplan. The formula used to calculate fiscal effort was described earlier: E=R/TB where E is fiscal effort, R is the amount of money spent for elementary and secondary education per pupil for the state and TB is the measure of wealth determined by the Gross State Product (GSP) on a per capita basis (Owings & Kaplan, 2006). Per pupil expenditure for elementary and secondary education is available from the United States Education Finance Statistics Center's website: http://nces.ed.gov/edfin/. The GSP is available from the United States Bureau of Economic Analysis website: http://www.bea.gov/.

A measure representing the poverty level of each state and the District of Columbia was also used in this study. The percentage of students receiving free or

reduced price lunch (FRPL) was used for this measure. The values were compiled from the National Center for Education Statistics: Common Core Data: http://nces.ed.gov/ccd/tables/2000_schoollunch_01.asp.

## Data Analysis

The data collected were inputted and examined using *HLM* for Windows software (Raudenbush & Byrk, 2002). The level 1 model used is represented below:

$Y_{ij} = \beta_{0j} + \beta_{1j}(Year_{1i}) + r_{ij}$

In this analysis, $Y_{ij}$ is the observed NAEP score in year i for state j; $\beta_{0j}$ is the observed NAEP score in year i for state j; $\beta_{1j}$ is NAEP times the Year slope for state j, and r is level 1 error. Level 1 provides the average NAEP score for each state and the slope over time to determine whether NAEP scores are declining or improving. These data are the dependent variables in the level 2 model. The level 2 model used is represented below:

$\beta_{0j} = \gamma_{00} + \gamma_{01}$ (FRPL) + $\gamma_{02}$ (FE) + $\gamma_{03}(\Delta FE) + u$: (mean NAEP score plus FPRL predictor)

$\beta_{1j} = \gamma_{10} + \gamma_{11}$ (FRPL) + $\gamma_{12}$ (FE) + $\gamma_{13}(\Delta FE) + u$

In level 2, the initial NAEP scores were modeled as a function of the FRPL continuous variable. Secondly, the time/NAEP slopes were modeled as a function of effort and change in effort from 1992 to 2009.

## Strengths and Limitations

In order to realize the contributions of this study to the current literature, it is important to discuss the strengths and limitations of this study. Correlational studies, while informational and legitimate, cannot determine causation. Correlational studies examine a relationship among variables. Determining relationships is valuable

information; however, it is important to realize that these studies do not allow causal inferences. Measurement, the use of the NAEP as an indicator of student achievement, can be considered a limitation. The researcher did not have control over what the NAEP measured or whether it is aligned to state curriculum. Due to the lack of a national curriculum, each state has its own accountability system with mandated assessments. The NAEP provides a cross section of math across several grade levels because it is administered in 4th and 8th grade. Depending on each state's curriculum and testing, the NAEP assessments may not be capturing true instructional gains due to a lack of alignment. However, NAEP scores are the only valid tool for cross-state comparisons.

The strengths of this study are generalizability and the use of a *HLM*. External validity is a strength in this study. Data from the entire nation were used. While students are sampled within states, the study is examining the national population, so generalizability is less of a concern. Using *HLM* is a strength of this study because it requires fewer statistical assumptions than other methodologies, and it considers the fact that the data are nested. *HLM* is also an effective model to use because it can deal with missing data and unequal time intervals which are present in this study. The information gleaned from this study adds to the current literature.

## Summary

This chapter described the methodology for the research question: how do sustained increases and decreases in state fiscal effort over time predict student performance outcomes on math NAEP scores for $4^{th}$ and $8^{th}$ grade students? The chapter provided a description of the sample and variables included in this study. The study design, the data collection, and the data analysis procedure were explained. Information

regarding state fiscal effort and reading and math NAEP scores was also provided. The chapter concluded with a discussion of the strengths and limitations of the study.

# CHAPTER 4

## Results

The purpose of this study was to examine the relationship between sustained increases and decreases of state fiscal effort on a student achievement variable over time. Data from all fifty states and the District of Columbia were used for this examination to increase the generalizability of the findings. Data were collected and calculated for an eighteen year time period: 1992-2009. Previous literature examined the relationship between per-pupil expenditure and student achievement in studies with smaller scopes, such as studies that used limited time frames or studies that examined specific states. Specifically, previous research had not examined the relationship between fiscal effort and student achievement in a longitudinal study. The variable of fiscal effort was selected to include a unique perspective to the current literature, and scores from $4^{th}$ and $8^{th}$ grade math NAEP assessments were selected as the student outcome measure to provide a statistically valid measure for cross-state comparison.

This chapter describes the findings for this study. A descriptive analysis of the data collected is followed by the results of the *HMLM*. The data are organized by the results for $8^{th}$ grade math NAEP assessments and $4^{th}$ grade math NAEP assessments. The results are synopsized in the summary.

## Descriptive Analysis of Variables

Descriptive data for the fifty states and the District of Columbia were collected. A full table of data for each year observed is provided in Appendix A. Summary data in the form of means and slopes, are reported in Table 2. For each state a mean score was calculated for Free or Reduced Price Lunch (FRPL), Fiscal Effort, and $4^{th}$ and $8^{th}$ grade

math NAEP scores. These calculations were completed using Microsoft Excel by adding numbers in a group and dividing by the count of the numbers in each group. For each state, slopes were also calculated for the variables of fiscal effort, and 4th and 8th grade math NAEP scores. Slope for each variable was calculated by dividing the vertical distance by the horizontal distance of points on a line. This value was computed using Microsoft Excel.

Table 2

*Description of State Data*

| ID | Mean FRPL | Slope FE | Mean FE | Slope 4th G. Math | Mean 4th G. Math | Slope 8th G. Math | Mean 8th G. Math |
|---|---|---|---|---|---|---|---|
| AK | 29.82 | 0.004862 | 0.241 | 1.07000 | 233.40 | 0.40000 | 280.40 |
| AZ | 40.83 | 0.001168 | 0.202 | 1.08504 | 224.71 | 0.69565 | 271.71 |
| AR | 52.09 | 0.004275 | 0.242 | 1.85997 | 226.28 | 1.17903 | 266.71 |
| CA | 49.45 | 0.002567 | 0.188 | 1.66432 | 221.42 | 0.59974 | 266.00 |
| CO | 31.64 | 0.000432 | 0.192 | 1.18027 | 234.00 | 0.7723 | 280.83 |
| CT | 27.33 | 0.000005 | 0.235 | 1.08504 | 237.71 | 0.62404 | 281.71 |
| DE | 36.64 | 0.005028 | 0.205 | 1.67727 | 231.66 | 1.32273 | 275.83 |
| DC | 59.00 | -0.00383 | 0.280 | 1.83184 | 203.14 | 1.17903 | 241.71 |
| FL | 46.45 | -0.00191 | 0.227 | 1.90455 | 231.16 | 1.12273 | 270.83 |
| GA | 48.09 | 0.005455 | 0.220 | 1.44182 | 226.57 | 1.12212 | 268.85 |
| HI | 41.73 | 0.006015 | 0.226 | 1.45972 | 224.57 | 0.84847 | 265.28 |
| ID | 37.27 | 0.002357 | 0.208 | 1.29676 | 234.66 | 0.66187 | 280.83 |
| IL | 37.67 | 0.002495 | 0.224 | 1.39754 | 233.20 | 0.56967 | 278.80 |

Table 2 Continued

| ID | Mean FRPL | Slope FE | Mean FE | Slope 4th G. Math | Mean 4th G. Math | Slope 8th G. Math | Mean 8th G. Math |
|---|---|---|---|---|---|---|---|
| IN | 34.45 | 0.002289 | 0.247 | 1.35806 | 235.71 | 0.89578 | 280.57 |
| IA | 30.73 | 0.001055 | 0.228 | 0.92711 | 236.57 | 0.06818 | 284.00 |
| KS | 38.09 | 0.001446 | 0.238 | 1.52869 | 242.6 | 0.70082 | 286.20 |
| KY | 47.33 | 0.002917 | 0.247 | 1.3977 | 227.14 | 0.99744 | 272.42 |
| LA | 61.55 | 0.003948 | 0.222 | 1.70396 | 220.85 | 1.47442 | 262.71 |
| ME | 33.27 | 0.003277 | 0.308 | 0.80243 | 237.14 | 0.2743 | 283.14 |
| MD | 32.18 | -0.00044 | 0.257 | 1.68478 | 230.71 | 1.30051 | 277.28 |
| MA | 27.73 | 0.002627 | 0.238 | 1.67455 | 240.57 | 1.59463 | 287.14 |
| MI | 35.18 | 0.001366 | 0.273 | 1.0665 | 232.14 | 0.45396 | 275.71 |
| MN | 29.45 | 0.001432 | 0.213 | 1.32353 | 239.85 | 0.70013 | 288.71 |
| MS | 66.27 | 0.004986 | 0.231 | 1.6929 | 218.00 | 1.22698 | 257.57 |
| MO | 38.00 | 0.002717 | 0.225 | 1.15729 | 232.28 | 0.7711 | 277.14 |
| MT | 34.18 | -0.00008 | 0.291 | 1.42647 | 237.16 | 0.49706 | 286.83 |
| NE | 34.45 | 0.002351 | 0.230 | 0.93414 | 232.85 | 0.29795 | 282.28 |
| NV | 34.20 | 0.001285 | 0.174 | 1.39118 | 227.16 | 0.65984 | 270.20 |
| NH | 17.27 | 0.003088 | 0.230 | 1.24548 | 243.8 | 0.73643 | 285.80 |
| NJ | 28.10 | 0.000883 | 0.295 | 1.42273 | 238.83 | 1.16629 | 283.80 |
| NM | 58.18 | 0.006048 | 0.217 | 1.09527 | 220.85 | 0.52558 | 263.71 |
| NY | 36.20 | 0.000484 | 0.300 | 1.58484 | 232.28 | 1.16968 | 276.42 |

Table 2 Continued

| ID | Mean FRPL | Slope FE | Mean FE | Slope 4th G. Math | Mean 4th G. Math | Slope 8th G. Math | Mean 8th G. Math |
|---|---|---|---|---|---|---|---|
| NC | 39.64 | 0.001933 | 0.199 | 1.77046 | 232.28 | 1.52366 | 276.71 |
| ND | 29.82 | 0.001905 | 0.224 | 1.09719 | 237.57 | 0.59527 | 287.00 |
| OH | 31.10 | 0.003144 | 0.253 | 1.61331 | 236.5 | 1.01079 | 281.16 |
| OK | 52.82 | -0.00069 | 0.221 | 1.09892 | 230.33 | 0.42446 | 272.33 |
| OR | 40.73 | -0.00064 | 0.253 | 1.23529 | 233.00 | 0.63529 | 281.50 |
| PA | 30.27 | 0.000678 | 0.280 | 1.32273 | 235.83 | 0.97285 | 281.00 |
| RI | 38.00 | 0.002004 | 0.309 | 1.42583 | 228.28 | 0.59655 | 272.14 |
| SC | 50.55 | 0.004319 | 0.241 | 1.80754 | 227.42 | 1.46419 | 272.57 |
| SD | 31.27 | 0.001785 | 0.202 | 0.70000 | 240.50 | 0.95 | 287.75 |
| TN | 49.40 | 0.003169 | 0.191 | 1.33824 | 225.00 | 0.97187 | 270.5 |
| TX | 47.18 | 0.001242 | 0.197 | 1.35102 | 234.42 | 1.31394 | 277.28 |
| UT | 31.45 | 0.001777 | 0.164 | 1.06074 | 233.00 | 0.5211 | 278.71 |
| VT | 26.55 | 0.004438 | 0.316 | 1.85294 | 239.50 | 1.06765 | 286.5 |
| VA | 30.91 | 0.003251 | 0.202 | 1.5243 | 234.28 | 1.25575 | 279.28 |
| WA | 36.11 | 0.000025 | 0.202 | 1.43 | 238.00 | 0.96 | 283.20 |
| WV | 49.73 | 0.001626 | 0.319 | 1.1298 | 227.71 | 0.58951 | 267.85 |
| WI | 29.27 | 0.0008 | 0.267 | 0.96364 | 237.66 | 0.48636 | 284 |
| WY | 32.70 | 0.005144 | 0.228 | 1.38107 | 235.28 | 0.78197 | 280.85 |

**FRPL**

In order to account for the poverty status of a state, the variable of Free or Reduced Price Lunch (FRPL) was used in this analysis. The percentage of students identified as receiving free or reduced lunch, reported by the National Center for Education Statistics, was the value used for this measure. Mean state FRPL was calculated for each state and the District of Columbia. This value was used as a continuous variable in the *HMLM* analysis. The percentage of state FRPL ranged from 17.27% (New Hampshire) to 66.27% (Mississippi). The difference between the two states was nearly 50%. Due to the low percentage of students receiving free or reduced lunch, New Hampshire would be considered a low poverty state. The high percentage of student receiving free or reduced lunch would result in the identification of Mississippi as high poverty state. The mean state FRPL for all states and the District of Columbia was 38.88%, and the mode for state FRPL was 29.82%. The value of FRPL was compared based on the grand mean of FRPL (38.88%). States with a mean score above the grand mean were considered High Poverty and states below the grand mean were considered Low Poverty.

**Fiscal Effort**

As mentioned earlier, the independent variable of state fiscal effort was selected for this study to provide a unique perspective to the research regarding funding and student achievement. Fiscal effort was calculated for each year and each state for the time period examined. The variable of fiscal effort was calculated using a ratio of mean state per-pupil expenditure and gross state product (GSP) per capita. Using GSP in the calculation allows each state's fiscal capacity to be included in the equation. Effort was

used rather than per-pupil expenditure to demonstrate how much of a state's resources were spent for education. With the assumption that money is spent on things that are meaningful or important, the calculation of fiscal effort is telling. In other words, fiscal effort can be described as a measure of the importance, or value, each state places on education.

The range for mean fiscal effort was much smaller than the range for state FRPL. Utah exerted the least amount of effort with a mean value of 16.4. West Virginia exerted the most effort with a value of 31.9. The difference between the two states was 15.5. West Virginia was followed closely by three states from the North East: Vermont (31.6), Rhode Island (30.9), and Maine (30.8). Nevada (17.45), California (18.8), and Tennesseee (19.1) were the states closest to Utah exerting the least fiscal effort. The mean for all states was 23.62, and the mode was 20.2. A specific look at the states which ranked the highest and lowest in the exertion of fiscal effort shows interesting results. While general comparisons between the two groups show slight differences between mean math scores for both $4^{th}$ and $8^{th}$ grade assessments, comparisons within each group are much more revealing. Within both groups two states are above the mean FRPL and two states are below. When scores are examined within each group, a ten point discrepancy is seen between schools with high levels of FRPL (high poverty) and schools with low percentages of FRPL (low poverty). Refer to Table 3 for the values.

Table 3

*Description of State Data for the Top 4 and Bottom 4 States According to Mean FE*

| ID | Mean FRPL | Slope FE | Mean FE | Slope 4th G. Math | Mean 4th G. Math | Slope 8th G. Math | Mean 8th G. Math |
|---|---|---|---|---|---|---|---|
| Top 4 | | | | | | | |
| WV | 49.73 | 0.001626 | 0.319 | 1.1298 | 227.71 | 0.58951 | 267.85 |
| VT | 26.55 | 0.004438 | 0.316 | 1.85294 | 239.5 | 1.06765 | 286.05 |
| RI | 38.00 | 0.002004 | 0.309 | 1.42583 | 228.28 | 0.59655 | 272.14 |
| ME | 33.27 | 0.003277 | 0.308 | 0.80243 | 237.14 | 0.2743 | 283.14 |
| Bottom 4 | | | | | | | |
| UT | 31.45 | 0.001777 | 0.164 | 1.06074 | 233.00 | 0.5211 | 278.71 |
| NV | 34.20 | 0.001285 | 0.174 | 1.39118 | 227.16 | 0.65984 | 270.20 |
| CA | 49.45 | 0.002567 | 0.188 | 1.66432 | 221.42 | 0.59974 | 266.00 |
| TN | 49.40 | 0.003169 | 0.191 | 1.33824 | 225.00 | 0.97187 | 270.5 |

The slope for fiscal effort was also calculated for each state. All slopes were very small. This means that the variance in scores over time was minimal. However, it is important to note that five states and the District of Columbia showed a negative slope which indicated a sustained decline in fiscal effort: District of Columbia, Florida, Maryland, Montana, Oklahoma, and Oregon. The research question in this study examines the relationship between sustained increases and decreases in fiscal effort and student achievement. The five states and the District of Columbia identified as having a negative slope demonstrated a sustained decrease in fiscal effort during the time period examined. All other states indicated a positive slope. This means that they demonstrated very slight, but sustained increases, in fiscal effort during the time period examined.

**NAEP**

The dependent variable in this study was mean math scores from 4th and 8th grade math NAEP assessments for all states that participated in the assessment for the years it was administered from 1992 to 2009. As described in chapter three, NAEP assessments were created for the purpose of cross-state comparisons. Because this study is comparing student achievement among states, NAEP assessments were the most valid measure to use.

Math NAEP scores are reported on a scale from 0-500. The mean 4th grade math NAEP scores were significantly lower than the mean 8th grade math NAEP scores. The mean 4th grade scores ranged from a low of 203.14 (DC) to a high of 243.8 (New Hampshire). The mean 8th grade scores ranged from a low of 241.71 (DC) to a high of 288.71 (Minnesota). The lowest score for the mean 8th grade math NAEP was nearly two percentage points lower than the highest mean 4th grade math NAEP score. The slopes for both math assessments were reported. For both assessments, all slopes were positive indicating that no state showed a decline in scores over the time period analyzed.

As stated earlier, five states and the District of Columbia experienced decreases in fiscal effort during the time period examined. Despite a decrease in fiscal effort, mean 4th and 8th grade math NAEP scores improved for these cases. It is interesting to note that the District of Columbia was identified as having the lowest mean score for both 4th and 8th grade math NAEP scores for all cases examined. To examine more thoroughly the relationship between fiscal effort and student achievement an *HMLM* analysis was conducted.

## Analysis of *HMLM*

Once the data were collected, they were formatted and entered into *HLM* software for analysis. Multivariate hierarchical linear modeling was used to statistically analyze a data structure where state data (level-1) were nested within state data over time (level-2). Due to a nonpositive definite variance covariance matrix, probably due to very high colinearity, *HLM* software could not be used. An alternative simulation of the *HMLM* equation was used in SPSS. The process was simulated by first calculating slope and intercept for the Level 1 dependent variables (NAEP scores) that would be used in the Level 2 equation. The level 2 models were simulated by creating separate equations predicting slope and intercept for the NAEP slopes and intercepts. In this case, intercepts are interpreted as the mean as the variables were centered. Additionally, all predictor variables were converted to z-scores to simulate grand mean centering common in *HLM* and to facilitate analyses of interaction effects (Aiken & West, 1991). The focus was the relation between NAEP scores (level-1 criterion variable) and both state level FRPL and state fiscal effort. Separate analyses were conducted for both mean 4th grade NAEP scores and mean 8th grade NAEP scores. Parallel analyses were run to test slope fiscal effort and slope NAEP. No significance was found, so they were not reported.

### Results for 8th Grade Math NAEP

In order to analyze the relationship between mean 8th Grade Math NAEP scores and fiscal effort, a blockwise regression, where variables were entered on step one and interaction effects were entered on step two, was conducted. Step one consisted of z-scores for FRPL and z-scores for Fiscal Effort. Step two was created to analyze the

combined effects of FRPL and Fiscal Effort on mean 8th Grade Math NAEP scores. Table 4 illustrates a summary of the regression.

Table 4

*Relationship Between 8th Grade NAEP and FE and FRPL*

| Model | *R* | *R Square* | *R Square Change* | *Sig F Change* |
|---|---|---|---|---|
| Main Effects | .843 | .710 | .710 | .000 |
| Interaction | .862 | .743 | .032 | .019 |

Regression results indicated that both models significantly predicted mean NAEP scores: model 1, $R^2$=.843, $R^2_{adj}$=.698, $F(2, 48)=58.90$, $p<.001$, model 2, $R^2$=.862, $R^2_{adj}$=.727, $F(3, 47)=45.29$, $p$=.019. The first model accounted for 84.3% of variance in NAEP scores; however, the data indicated that only FRPL significantly contributed to the model. In this model, fiscal effort was not identified as a predictor of mean 8th grade math NAEP scores. The second model accounted for 86.2% of the variance in mean NAEP scores. In this model, both FRPL and the Interaction (between FRPL and Fiscal Effort) were significant contributors. The second model accounted for nearly 2% more variance than the first model. This means that a significant interaction is present between the variables of FRPL and Fiscal Effort as predictors of student achievement using mean 8th grade math NAEP scores as the measure. Refer to Tables 5 and 6 for a summary of regression coefficients for both models.

Table 5

*Summary of Coefficients for the Main Effects (8th Grade)*

| Model | *B* | β | *t* | *Sig* |
|---|---|---|---|---|
| (Constant) | 276.331 | | 392.53 | .000 |
| Fiscal Effort | -.349 | -.038 | -.489 | .627 |
| FRPL | -7.745 | -.846 | -10.84 | .000 |

Table 6

*Summary of Coefficients for the Interaction (8th Grade)*

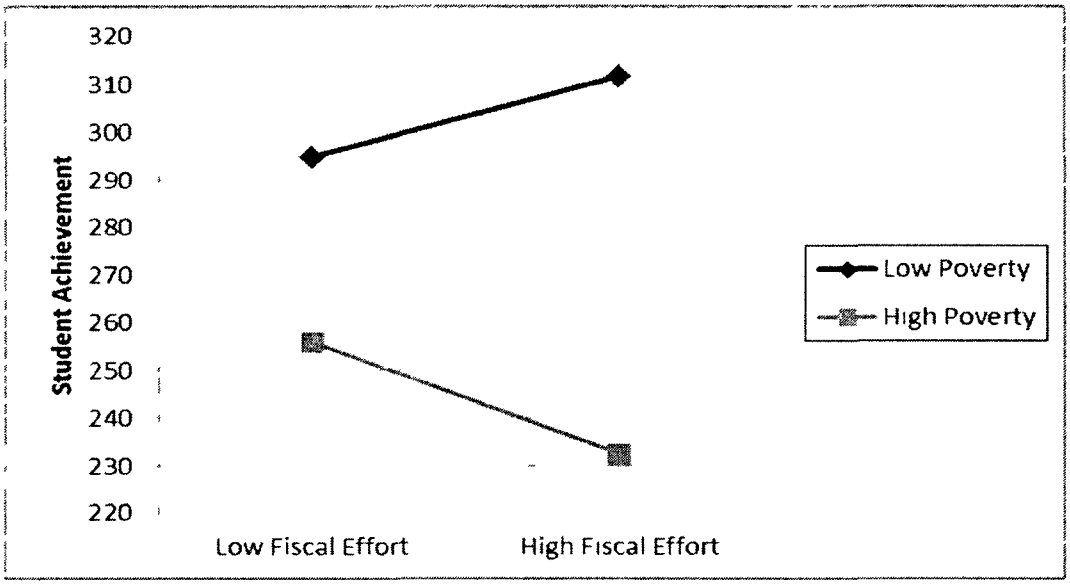
| Model | *B* | β | *t* | *Sig* |
|---|---|---|---|---|
| (Constant) | 276.127 | | 408.76 | .000 |
| Fiscal Effort | -.680 | -.074 | -.980 | .332 |
| FRPL | -7.731 | -.844 | -11.36 | .000 |
| Interaction | -2.017 | -.184 | -2.437 | .019 |

The second model was adopted as the final model because the entry of the interaction term added a significant amount of explained variance, NAEP = 276.127-.680(FE) -7.731(FRPL) - 2.017(FE*FRPL). Data from the model were graphed to illustrate the relationship and interaction of the variables. Points for this graph show values that are two standard deviations above and below the mean as indicators of High and Low Poverty. Figure 5 is a visual representation of the interaction. In general, Fiscal Effort affected student achievement as measured by mean 8th Grade Math NAEP scores. Student achievement in High Poverty states was lower than student achievement in Low Poverty states in both categories: Low Fiscal Effort and High Fiscal Effort. However, a significant interaction was present between Fiscal Effort and FRPL. In Low Poverty states, student achievement, measured by mean 8th Grade Math NAEP scores, was lower in states with low fiscal effort and higher in states with high fiscal effort. This was not the situation in High Poverty states. In High Poverty states, student achievement, measured by mean 8th Grade Math NAEP scores, was lower in states with High Fiscal Effort and higher in states with Low Fiscal Effort. In other words, the combined effects of Fiscal Effort and the poverty status of a state were predictors of student achievement. The results demonstrated that increased levels of Fiscal Effort in Low Poverty states was

mirrored by a higher level of student achievement, while increased levels of Fiscal Effort in High Poverty schools was accompanied by a lower level of student achievement.

Figure 5

*Relationship Between 8th Grade Student Achievement and Fiscal Effort and FRPL*




**Results for 4th Grade Math NAEP**

The same process described above was used to analyze the relationship between mean 4th Grade Math NAEP scores and fiscal effort; a blockwise regression was conducted. Step one consisted of z-scores for FRPL and z-scores for Fiscal Effort. Step two was created to analyze the combined effects of FRPL and Fiscal Effort on mean 4th Grade Math NAEP scores. Table 7 illustrates a summary of the regression.

Table 7

*Relationship Between 4th Grade NAEP and FE and FRPL*

| Model | *R* | *R Square* | *R Square Change* | *Sig F Change* |
|---|---|---|---|---|
| Main Effects | .827 | .684 | .684 | .000 |
| Interaction | .842 | .710 | .026 | .047 |

Like the 8th grade math regression results, the 4th grade regression results indicated that both models significantly predicted mean NAEP scores: model 1, $R^2$=.827, $R^2_{adj}$=.671, $F(2, 48)$=51.98, $p$<.001, model 2, $R^2$=.842, $R^2_{adj}$=.691, $F(3, 47)$=38.31, $p$=.047. The first model accounted for 82.7 % of variance in mean NAEP scores; however, the data indicated that only FRPL significantly contributed to the model. Again, fiscal effort was not found to be significant in this model. The second model accounted for 84.2% of the variance in NAEP scores. In this model, both FRPL and the Interaction (between FRPL and Fiscal Effort) were significant contributors. The second model accounted for 1.5% more variance than the first model. This means that the combined effects of FRPL and Fiscal Effort are predictors of mean 4th Grade Math NAEP scores. Tables 8 and 9 provide a summary of regression coefficients for both models.

Table 8

*Summary of Coefficients for the Main Effects (4th Grade)*

| Model | *B* | β | *t* | *Sig* |
|---|---|---|---|---|
| (Constant) | 231.685 | | 392.60 | .000 |
| Fiscal Effort | -.086 | -.012 | -.143 | .887 |
| FRPL | -6.085 | -.828 | -10.16 | .000 |

Table 9

*Summary of Coefficients for the Interaction (4th Grade)*

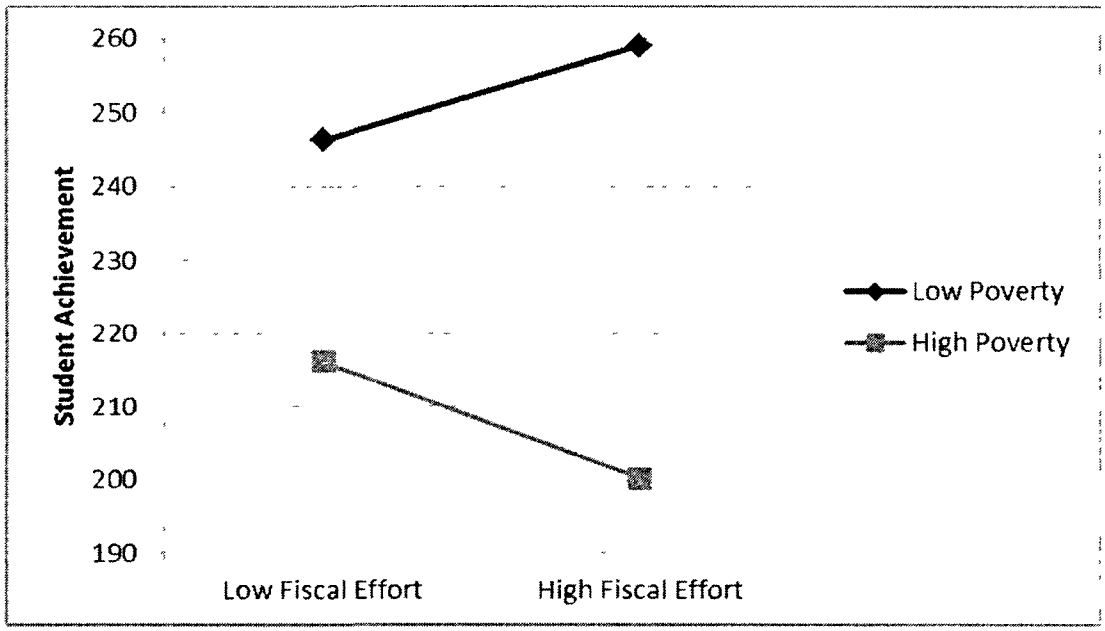
| Model | *B* | β | *t* | *Sig* |
|---|---|---|---|---|
| (Constant) | 231.540 | | 401.90 | .000 |
| Fiscal Effort | -.321 | -.044 | -.543 | .590 |
| FRPL | -6.075 | -.827 | -10.47 | .000 |
| Interaction | -1.437 | -.163 | -2.036 | .047 |

The second model was adopted as the final model because the entry of the interaction term added a significant amount of explained variance, NAEP = 231.540 -

.321(FE) – 6.075(FRPL) – 1.437(FE*FRPL). Data from the model were graphed to illustrate the relationship and interaction of the variables. Points for this graph show values that are two standard deviations above and below the mean as indicators of High and Low Poverty. Figure 6 provides a visual of the relationship. The same results were found as the mean 8th Grade Math NAEP regression. In general, Fiscal Effort affected student achievement as measured by mean 4th Grade NAEP Scores. However, a significant interaction was present between Fiscal Effort and FRPL. In Low Poverty states, student achievement, measured by mean 4th Grade Math NAEP scores, was higher in states with higher levels of Fiscal Effort and lower in states with lower levels of Fiscal Effort. In High Poverty states, student achievement, measured by mean 4th Grade Math NAEP scores, was lower in states with high levels of Fiscal Effort and higher in states with low levels of Fiscal Effort. As demonstrated by analyses of both mean 4th grade and mean 8th grade math NAEP scores, the effect of Fiscal Effort on student achievement was impacted by the poverty status of a state. While the range of the mean math scores differed between the two assessments, the results were similar. Both analyses demonstrated that higher levels of Fiscal Effort in Low Poverty schools were paralleled by higher levels of student achievement, while higher levels of Fiscal Effort in High Poverty schools was accompanied by lower levels of student achievement. The implications of both analyses are discussed further in Chapter 5.

Figure 6

*Relationship Between 4th Grade Student Achievement and Fiscal Effort and FRPL*




## Summary

The results reported in this chapter provide evidence of a correlation between fiscal effort and student achievement. The hypothesis that sustained increases and decreases in fiscal effort would result in increases or decreases in student achievement were not supported by the results in this chapter. Five states and the District of Columbia were identified as having periods of sustained decreases in fiscal effort over the time period examined; however, decreases in student achievement as measured by scores from the 4th and 8th grade math assessments were not observed. Fiscal effort alone was not identified as a predictor of student achievement. However, a statistically significant relationship existed in the interaction between fiscal effort and FRPL and student achievement. Higher levels of fiscal effort were correlated to higher student achievement in low poverty states. In high poverty states, higher levels of fiscal effort were not

correlated to higher student achievement. In Chapter 5, a thorough discussion of the findings is presented.

# CHAPTER 5

## Discussion

The purpose of this study was to examine the relationship between sustained increases and decreases in state fiscal effort on student achievement measured by 4th and 8th grade math NAEP assessments over time. The preceding chapters of this dissertation offered information necessary for a thoughtful discussion of the results. The final chapter summarizes the information in the previous chapters, contains a thorough discussion of the findings, presents implications for educators, and shares recommendations for further research.

The first two chapters of this dissertation explained the purpose and context of the problem. While financial decisions are always important, the current financial state of our nation has resulted in a situation where all levels of government have to make difficult decisions regarding expenditures. With pressure from legislation and a call for students to be prepared to compete in a global economy, it is essential to show evidence of a correlation between funding and student achievement. The debate regarding the relationship between funding and student achievement has been long standing. Chapter 2 described the debate in detail citing studies that reported a correlation between funding and student achievement and studies that reported no correlation between funding and student achievement. Previous research on this topic has varied greatly in perspective. A common weakness in the previous literature was limited generalizability. The studies often focused on one locality or state. Also, many of the previous studies examined data from a limited period of time. Long term effects were not examined. The previous literature commonly used per-pupil expenditure as a measure of funding which does not

consider the wealth, or fiscal capacity, of each state. Due to the 10th Amendment, public education is a state's responsibility. States and localities carry the majority of the funding burden for education. While all states provide funding for education, state funding is not consistent across all states. To improve upon the previous literature, this study used the measure of fiscal effort, a ratio of per-pupil expenditure and Gross State Product (GSP), to include an indicator of each state's capacity. This provides a unique perspective. Scores from 4th and 8th grade math NAEP assessments were used as indicators of student achievement because they are currently the only assessments that provide a common measure for cross-state comparisons. Using these variables and examining them over an eighteen year period improves upon the current literature.

The intent of this research was to expand upon the current literature regarding the relationship between funding and student achievement by investigating the relationship between the unique variable of fiscal effort and student achievement over an eighteen year period. The following research question was addressed:

- How do sustained increases and decreases in state fiscal effort over time predict student performance outcomes on math NAEP scores for 4th and 8th grade students?

The study design selected to address this question was a hierarchical multivariate linear model (*HMLM*) which is a specific type of hierarchical linear model (*HLM*). Due to the fact that state data, fiscal effort, and NAEP scores, were examined over time within each state, the data were hierarchical or nested within each state. In order to accurately examine nested data, specific methodological approaches were necessary. While several methods were capable of handling this type of study, the assumptions associated with

them were laborious (Osborne, 2008). Not meeting the assumptions would lead to a situation of inaccurate results. *HLM* requires fewer statistical assumptions and accounts for the fact that the data are nested. In this study, a situation of missing data and uneven years of data had to be considered for the variable of math NAEP assessments. *HLM* is a more effective model to use in this situation as well because it can deal with missing data and unequal time intervals (Osborne, 2008). The specific model of an *HMLM* was selected because data for this study are limited to the state level; however, the repeated state data over time are nested within each state.

## Summary of Results

The hypothesis states with sustained increases in fiscal effort over time will observe improvement in student performance on math NAEP scores over time, and states with sustained decreases in fiscal effort over time will observe no improvement in student performance or a decline in student performance on math NAEP scores over time, was not supported by the findings. In general, states that experienced sustained decreases in levels of fiscal effort over the time period examined experienced an increase on math NAEP assessment scores.

*HMLM* analyses were conducted to examine relationships between fiscal effort and mean $4^{th}$ and $8^{th}$ grade math NAEP assessment scores. These analyses showed that fiscal effort alone was not a predictor of student achievement according to mean math NAEP scores. However, the combined effects of fiscal effort and FRPL were significant predictors of student achievement. The interaction model produced the same results for both $4^{th}$ and $8^{th}$ grade math NAEP assessments. The analyses showed that low poverty states with high levels of fiscal effort demonstrated higher levels of student achievement

than states with low levels of fiscal effort. In contrast, high poverty states with low levels of fiscal effort demonstrated higher levels of student achievement than states with high levels of fiscal effort. In summary, the findings from the study provided little evidence to support the hypothesis. Fiscal effort alone was not a significant predictor of student achievement. However, the interaction between fiscal effort and FRPL was a significant predictor of student achievement. When examining the interaction, it can be said that the findings support the fact that increases in fiscal effort result in increases in student achievement; however, this is only true in low poverty states. Increases in fiscal effort did not result in increased student achievement in high poverty states. In addition to these findings, states with sustained decreases in fiscal effort did not experience decreased performance or no improvement on student achievement. The results from the analyses found that FRPL was a much more significant predictor of student achievement than fiscal effort.

## Discussion of Results

While the hypothesis of this study was not entirely supported, useful information was obtained through examination of the data and analyses. The variables and methodology selected for this study made this a unique perspective in the investigation of a relationship between funding and student achievement in comparison of other studies. By using data from all fifty states and the District of Columbia, this study had a wide scope making generalizability a strength.

Comparing student achievement in all fifty states and the District of Columbia made it essential to select a dependent variable of achievement that would allow for valid comparisons between states. Lack of a common instrument to examine change over time

was found to be a limitation in many studies examining student outcomes (Swanson & Stevenson, 2002). NAEP assessments are a statistically valid measure of student achievement on a national level (Grissmer & Flannagan, 2001). It is for that reason, that math NAEP assessments were used as dependent variables for this study.

The use of fiscal effort in this study provided a unique perspective to the literature examining funding and student achievement. As mentioned earlier, states provide the majority of funding for public education. Funding formulas in each state are different, and the amount spent on education between states varies greatly. Fiscal effort has not been examined in much of the previous literature. Using fiscal effort as an independent variable captures how much of a state's capacity is expended for education among states.

Examining a span of eighteen years expanded the current literature; however, the longitudinal study created a situation of nested data with missing data and uneven intervals of time. This resulted in a situation where sophisticated, quantitative methods of hierarchical linear modeling were used to ensure accurate analysis of the data. Examining data over short periods of time would not be appropriate to determine the relationship between funding and achievement. A longitudinal analysis was necessary. The use of *HLM* analysis can be used in other educational studies examining the relationship between funding and student achievement to provide accurate findings in other studies with nested data.

The findings from this study are revealing. While fiscal effort alone was not a significant predictor of student achievement, the interaction between fiscal effort and FRPL was a significant predictor. In Chapter 4, Table 2 reported the summary data for each state and the District of Columbia. An examination of both the means and slopes of

fiscal effort are informative. The range for fiscal effort is 15.5: low 16.4 (UT) high 31.9 (WV). This information highlights the fact that states contribute varying amounts toward education when considering their wealth. For example, West Virginia was identified in Chapter 4 as having the highest level of fiscal effort at 31.9. Virginia fell below the mean fiscal effort for all states at 20.2. According to per-pupil expenditure data from the U.S. Department of Education (EDFIN, 2011), both states have spent a very similar amount per-pupil over the last eighteen years, an average of $7,500.00. However, wealth measured by GSP shows that Virginia has a greater capacity to fund education than West Virginia, a difference on average of more than $10.000.00. This demonstrates the contrast in a West Virginia's commitment to education and Virginia's commitment to education.

As discussed in Chapter 4, the slope for fiscal effort within each state for the time observed was less than one. This means that the increases or decreases in fiscal effort during the time span examined were extremely small. In other words, a slope of zero indicates a horizontal line if the measures of fiscal effort were plotted over time. The slope of fiscal effort for all states and the District of Columbia were relatively flat. The situation of such slight changes in fiscal effort over time could be a reason why it is not identified as a predictor on its own. The analyses of the *HMLM* did find that FRPL was a significant predictor of student achievement. Consider the example used to demonstrate variation in spending using West Virginia and Virginia. While per-pupil expenditures were similar among states, West Virginia exerted more effort towards education than Virginia. Virginia had a mean FRPL of 30.9. West Virginia had a mean FRPL of 49.73. The mean math NAEP scores for Virginia were higher than the scores for West Virginia.

It could be argued that the differences in scores, despite the greater effort in West Virginia, were due to the high number of high poverty schools in West Virginia compared to Virginia. However, the analyses also found that the interaction between fiscal effort and FRPL significantly predicted student achievement. Table 3 in Chapter 4 illustrates this fact when the top four states and the bottom four states, according to mean fiscal effort, were compared. Within each group, two states were identified as being above the mean FRPL and below the mean FRPL. Within each group, the scores differed nearly ten points with states having higher FRPL resulting in lower mean NAEP scores. These findings were intriguing; however, explanations for those findings appear rather clear.

**Possible Explanations for Findings**

The results from the *HMLM* analyses showed two interesting findings. The first finding was the positive relationship between fiscal effort and student achievement in low poverty states. The second was the negative relationship between fiscal effort and student achievement in high poverty states. As described in Chapter 2, other studies have found positive relationships between increased funding and achievement measured by math assessments, such as Verstegen (1994) and Lee and Wong (2004). Interestingly, a study described in Chapter 2 conducted by Okpala reported no relationship between per-pupil expenditures and student achievement in a high poverty school district in North Carolina. The opposite effect of fiscal effort on high poverty versus low poverty schools was not anticipated.

The fact that student achievement in states with high poverty and higher levels of fiscal effort was lower than states with high poverty and lower levels of fiscal effort was

unexpected. In order to address the unexpected results, two possible explanations were considered. The first possibility is determining if the level of fiscal effort in states with high poverty is a reaction to low performance. The second possibility is the effects of characteristics of high poverty schools. The following is a discussion of both possibilities.

**State Reaction to Low Performance**

A possible explanation for the unexpected results is the idea that high fiscal effort in high poverty states may be a reaction to the situation of low performance. This study is designed to identify correlation not causation. In other words, when a state has low poverty, high levels of fiscal effort result in higher levels of student achievement. Conversely, states with high poverty and higher levels of fiscal effort result in lower student achievement. As described previously, states are under pressure to meet adequate yearly progress (AYP) requirements of Public Law 107-110. Higher levels of fiscal effort in states with higher levels of poverty may be a state's reaction to the low student performance. In other words, low student achievement scores in these states may have been the reason why states were exerting more fiscal effort towards education. In this situation, higher levels of fiscal effort would not show higher levels of student performance as expected. The effects of high poverty do not appear to be overcome solely by increased fiscal effort.

**Characteristics of High Poverty Schools**

State data were used in this study which means that while districts within states varied greatly in their capacity and per-pupil expenditures the average for each state was used. Keeping this general view in mind, another possible explanation could be

differences in classrooms between high poverty and low poverty schools. The differences between high poverty and low poverty schools are supported in the professional literature. Current literature has identified the Alpha and Omega syndrome within districts (Owings & Kaplan, 2010). This term is used to describe what high schools community members identify as the school they would most like their children to attend and the school they would least like their children to attend in equity audits. The school identified as the Alpha school is the school most community members would like their students to attend. The Omega school is the school most community members would not like their students to attend. A recent study compared the budgets of an Alpha and Omega school in the same district. The findings showed that for every $1.00 spent per pupil in the Alpha school only .40 cents were spent per pupil in the Omega school. A disparity in funding is illustrated in this example. Darling-Hammond (2006) asserts disparities in funding between high poverty and low poverty schools result in increased disadvantages for minority students over time. These disparities appear in many forms.

**Teacher characteristics.** The characteristics of teachers in high versus low poverty schools are important to consider. Teacher quality is an important factor when examining possibilities for the findings in this study. In a study conducted by Darling-Hammond (2000), teacher quality was more significant than other factors, such as poverty, pertaining to student outcomes. Students in high poverty schools are 4.5 times more likely to encounter less prepared teachers than their counterpart in low poverty schools (Kaplan & Owings, 2011). High rates of teacher turnover, as well as high numbers of novice teachers in high poverty schools result in a greater probability of students encountering less prepared teachers in high poverty schools (Kaplan & Owings).

As teachers gain experience, many move from high poverty schools to low poverty schools. Many studies report the discrepancies in teacher experience and quality in high poverty versus low poverty schools.

**Student characteristics.** Students attending high poverty schools tend to demonstrate different characteristics than students attending low poverty schools. Students at high poverty schools have higher rates of absenteeism and transiency than students in low poverty schools. Absenteeism and transiency affect student achievement. James Heckman, Nobel laureate economist, asserted that disparities between advantaged and disadvantaged students are present by age 5 (Kaplan & Owings, 2011, p. 343). This means that higher percentages of students begin school at a disadvantage in high poverty schools than in low poverty schools.

**Curriculum and pedagogy.** In addition to teacher and student characteristics, curriculum and teaching practices are often different in high versus low poverty schools. In high poverty schools, curriculum is often basic with a concentration on preparation for state accountability testing. In low poverty schools, curriculum provides opportunities for critical thinking and problem solving. The tracking system used by our educational system perpetuates the problem of lower level or basic curriculum for high poverty or minority students (Kaplan & Owings, 2011). Teaching practices in high poverty schools tend to be teacher centered with an emphasis on drill and practice while low poverty schools tend to have student-centered classrooms with an emphasis on constructivist instruction (Kaplan & Owings).

**Psychological factors.** In addition to the characteristics discussed above, student needs are a factor. Examining these finding from a psychological perspective, Maslow's

Hierarchy of Needs should be considered. In high poverty schools, a higher percentage of students do not have their basic needs met than low poverty schools. In situations like these, performance on an assessment like the NAEP may not be a priority for the students.

The NAEP assessment itself may be another factor. NAEP outcomes are not attached to sanctions like state accountability tests. This may lead to a situation where teachers and students do not put forth much effort towards this assessment. NAEP outcomes are not tied to school or student consequences like state accountability tests. Schools receive sanctions for low performance on state accountability tests. State accountability tests also have consequences for students. For example, some circumstances call for students to complete remediation courses rather than choose electives. Also, when state accountability tests are not passed, graduation may be threatened. Because consequences are not tied to the NAEP, students may not put forth their best effort when taking the assessments.

All of the factors described above may contribute to the unexpected findings of this study; higher levels of fiscal effort in high poverty schools resulted in lower levels of student achievement while higher levels of fiscal effort in low poverty schools resulted in higher levels of student achievement. This research clearly showed that an important interaction was present between fiscal effort and FRPL as it related to student achievement and has implications for educators and policy makers.

## Implications

These findings have implications for practice on all levels: local, state, and national. The first implication is to promote more and advanced research regarding the

relationship between fiscal effort and student outcomes. The more educators increase their knowledge of budgeting practices and the results they produce the better budgeting decisions will be made to improve education. Thorough analysis of funding and student achievement in this study produced unexpected, yet intriguing results. The finding that the combined effects of fiscal effort and FRPL impacted student achievement is important for policy implications. The use of methodologies such as *HLM*, which account for the situations of nested data that are commonly found in educational research, should be encouraged. Not only is more information needed, but the information should be of the highest quality.

The second implication is to use research findings to improve student achievement for all students. Professional literature clearly shows that all students do not have the same advantages. This research demonstrated the importance of fiscal effort in combination with the poverty status of states. This information can be used in the discussions and policy decisions regarding equity of education for all students. Examining the differences in fiscal effort between states provides interesting information when discussing equity for all students. The fact that the combined effect of fiscal effort and FRPL can significantly impact student achievement provides even stronger evidence that fiscal effort and FRPL must be considered when discussing the improvement of student performance for all students.

With findings that highlight the discrepancies between high poverty and low poverty states, policy makers should take steps to improve the situation. With teacher quality identified as one of the most significant factors in student performance, policy makers should consider ensuring that funding is used to improve teacher quality in high

poverty states. Further investigations regarding the relationship between funding and student achievement will lead to more findings that will continue to help improve education.

## Future Research

Given the significant findings three suggestions for further research are recommended. The first recommendation would be to expand upon this research by examining other curricular areas such as reading, writing, and science. The second and third suggestion would be to conduct the same analyses within a specific state and within a specific division to see if the results would be replicated by examining fiscal effort and student achievement within a state or district. The fourth suggestion would be to use funding as a covariate for high versus low poverty schools.

The findings in this study were limited to student achievement measured by the math NAEP assessment. This results show a correlation between fiscal effort and FRPL on math achievement. Further research should be conducted in the subjects of reading, writing, science, and history. It would be interesting to know if this interaction effect is present only in math or if it is replicated in other subject areas.

This study compared the fiscal effort and student achievement of all fifty states and the District of Columbia. This required state data which meant that values were reported as state averages. Data for districts, schools, and classroom were not examined. Examining fiscal effort and student achievement within a state would provide a different perspective. Localities within each state exert different levels of fiscal effort towards education. Using state accountability tests as the measure of student achievement, an analysis can be conducted to examine the relationship between fiscal effort and student

achievement within states. This would provide the opportunity to use more specific data than state averages.

The next suggestion would be to drill down even further and examine the effect of fiscal effort on student achievement within a district. Current literature identifies disparities in funding within districts as an area of future litigation (Owings & Kaplan, 2010). While many cases have focused on between-district fiscal disparities, such as the Serrano v. Priest (1971) discussed in Chapter 2, the focus is shifting to intra-district fiscal disparities (Owings & Kaplan). Examining fiscal effort and student achievement within a school district, would provide an opportunity to use specific data at different levels: school data, classroom data, and student data. With the shift in litigation to intra-district funding, this information will be necessary from a policy an legal perspective.

The last suggestion for future research would be to investigate the relationship between funding and school poverty status. As mentioned above, an interesting finding of this study is that fiscal effort appears to be positively related with student achievement in low poverty schools and negatively related with student achievement in high poverty schools. One of the possible explanations presented proposed that higher levels of fiscal effort in high poverty states could be occurring as a reaction to the low performance of the students. A research study using funding as the predictive variable and examining its relationship to school poverty status (low to high) would help determine if an association is actually present between the two. Additionally, that study should examine the budget categories and the percentages of funds for instruction versus other areas.

## Conclusion

The results of this research did not entirely support the hypothesis that increased fiscal effort would result in increased student achievement measured by 4th and 8th grade math NAEP scores over time, and decreases in fiscal effort would result in decreased student achievement measured by 4th and 8th grade math NAEP scores over time. The data showed that fiscal effort alone was not a predictor of student achievement. Findings from the analysis showed that increased fiscal effort in low poverty states did result in increased student achievement over time. However, the opposite results were found to be true in high poverty states. As fiscal effort increased in high poverty states, student achievement decreased. Although the findings were not expected, they provide valuable information that can be used to make positive policy changes to improve education for all students, and they provide information that warrants further research in this area of study.

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## Appendix A: Detailed State Data from 1992-2009

Table 10

Detailed State Data from 1992-2009

| State | Year | Fiscal Effort | 4th Math | 8th Math | Per-Pupil | GSP |
|---|---|---|---|---|---|---|
| Alabama | 1992 | 0.186710361 | 208 | 252 | 3,615.98 | 19,366.81 |
| Alabama | 1993 | 0.189928971 | | | 3,761.13 | 19,802.80 |
| Alabama | 1994 | 0.194133602 | | | 4,036.53 | 20,792.54 |
| Alabama | 1995 | 0.201300051 | | | 4,404.77 | 21,881.63 |
| Alabama | 1996 | 0.208556092 | 212 | 257 | 4,716.17 | 22,613.41 |
| Alabama | 1997 | 0.20888146 | | | 4,903.29 | 23,474.02 |
| Alabama | 1998 | 0.213328244 | | | 5,165.56 | 24,214.13 |
| Alabama | 1999 | 0.218161265 | | | 5,511.62 | 25,263.98 |
| Alabama | 2000 | 0.223770106 | 218 | 262 | 5,758.43 | 25,733.68 |
| Alabama | 2001 | 0.227768322 | | | 6,052.01 | 26,570.89 |
| Alabama | 2002 | 0.228832536 | | | 6,327.23 | 27,650.04 |
| Alabama | 2003 | 0.229296038 | 223 | 262 | 6,642.06 | 28,967.17 |
| Alabama | 2004 | 0.217173312 | | | 6,812.24 | 31,367.75 |
| Alabama | 2005 | 0.219657629 | 225 | 262 | 7,308.93 | 33,274.21 |
| Alabama | 2006 | 0.228555131 | | | 7,979.70 | 34,913.67 |
| Alabama | 2007 | 0.258937773 | 229 | 266 | 8,390.62 | 32,404.00 |
| Alabama | 2008 | 0.270587122 | | | 9,103.36 | 33,643.00 |
| Alabama | 2009 | 0.268008293 | 228 | 269 | 8,870.00 | 33,096.00 |
| Alaska | 1992 | 0.220219177 | | | 8,450.26 | 38,372.04 |
| Alaska | 1993 | 0.227989819 | | | 8,734.58 | 38,311.27 |
| Alaska | 1994 | 0.231875723 | | | 8,882.11 | 38,305.48 |
| Alaska | 1995 | 0.218402123 | | | 8,963.20 | 41,039.89 |
| Alaska | 1996 | 0.210269826 | 224 | 278 | 9,012.07 | 42,859.56 |
| Alaska | 1997 | 0.207422897 | | | 9,097.31 | 43,858.73 |
| Alaska | 1998 | 0.242847693 | | | 9,074.49 | 37,367.00 |
| Alaska | 1999 | 0.236554033 | | | 9,208.80 | 38,928.97 |
| Alaska | 2000 | 0.224424436 | | | 9,668.16 | 43,079.81 |
| Alaska | 2001 | 0.237549225 | | | 9,997.69 | 42,086.80 |
| Alaska | 2002 | 0.228669819 | | | 10,419.20 | 45,564.40 |
| Alaska | 2003 | 0.223453563 | 233 | 279 | 10,769.63 | 48,196.29 |
| Alaska | 2004 | 0.209450374 | | | 11,074.34 | 52,873.33 |
| Alaska | 2005 | 0.199530066 | 236 | 279 | 11,851.11 | 59,395.13 |
| Alaska | 2006 | 0.20436647 | | | 12,537.04 | 61,345.89 |
| Alaska | 2007 | 0.304822648 | 237 | 283 | 12,300.20 | 40,352.00 |
| Alaska | 2008 | 0.337704766 | | | 14,629.71 | 43,321.00 |
| Alaska | 2009 | 0.365040521 | 237 | 283 | 15,551.82 | 42,603.00 |

Table 10 Continued

| State | Year | Fiscal Effort | 4th Math | 8th Math | Per-Pupil | GSP |
|---|---|---|---|---|---|---|
| Arizona | 1992 | 0.215243 | 215 | 265 | 4,380.74 | 20,352.47 |
| Arizona | 1993 | 0.215301 | | | 4,509.82 | 20,946.56 |
| Arizona | 1994 | 0.20539 | | | 4,610.51 | 22,447.59 |
| Arizona | 1995 | 0.203583 | | | 4,778.33 | 23,471.18 |
| Arizona | 1996 | 0.197046 | 218 | 268 | 4,860.19 | 24,665.25 |
| Arizona | 1997 | 0.190433 | | | 4,940.29 | 25,942.42 |
| Arizona | 1998 | 0.181818 | | | 5,122.46 | 28,173.53 |
| Arizona | 1999 | 0.177071 | | | 5,234.70 | 29,562.75 |
| Arizona | 2000 | 0.178543 | 219 | 271 | 5,478.36 | 30,683.65 |
| Arizona | 2001 | 0.193336 | | | 6,031.60 | 31,197.47 |
| Arizona | 2002 | 0.204887 | | | 6,469.52 | 31,576.03 |
| Arizona | 2003 | 0.208064 | 229 | 271 | 6,784.00 | 32,605.30 |
| Arizona | 2004 | 0.20417 | | | 6,898.48 | 33,787.86 |
| Arizona | 2005 | 0.202377 | 230 | 274 | 7,217.71 | 35,664.66 |
| Arizona | 2006 | 0.202578 | | | 7,636.95 | 37,698.83 |
| Arizona | 2007 | 0.217878 | 232 | 276 | 7,196.30 | 33,029.00 |
| Arizona | 2008 | 0.230867 | | | 7,607.74 | 32,953.00 |
| Arizona | 2009 | 0.237233 | 230 | 277 | 7,813.27 | 32,935.00 |
| Arkansas | 1992 | 0.219759 | 210 | 256 | 4,030.65 | 18,341.18 |
| Arkansas | 1993 | 0.217394 | | | 4,124.23 | 18,971.19 |
| Arkansas | 1994 | 0.21274 | | | 4,280.28 | 20,119.73 |
| Arkansas | 1995 | 0.212073 | | | 4,458.51 | 21,023.52 |
| Arkansas | 1996 | 0.214586 | 216 | 262 | 4,709.93 | 21,948.91 |
| Arkansas | 1997 | 0.214306 | | | 4,840.12 | 22,585.15 |
| Arkansas | 1998 | 0.212218 | | | 4,998.69 | 23,554.53 |
| Arkansas | 1999 | 0.209868 | | | 5,192.76 | 24,743.01 |
| Arkansas | 2000 | 0.225666 | 217 | 261 | 5,627.82 | 24,938.68 |
| Arkansas | 2001 | 0.23203 | | | 5,941.72 | 25,607.57 |
| Arkansas | 2002 | 0.250233 | | | 6,676.36 | 26,680.61 |
| Arkansas | 2003 | 0.251217 | 229 | 266 | 6,980.84 | 27,788.13 |
| Arkansas | 2004 | 0.245511 | | | 7,306.99 | 29,762.38 |
| Arkansas | 2005 | 0.262987 | 236 | 272 | 8,243.27 | 31,344.80 |
| Arkansas | 2006 | 0.267766 | | | 8,748.46 | 32,672.07 |
| Arkansas | 2007 | 0.275568 | 238 | 274 | 8,283.57 | 30,060.00 |
| Arkansas | 2008 | 0.27318 | | | 8,541.25 | 31,266.00 |
| Arkansas | 2009 | 0.272708 | 238 | 276 | 8,711.92 | 31,946.00 |
| California | 1992 | 0.179409 | 208 | 261 | 4,746.01 | 26,453.53 |
| California | 1993 | 0.17933 | | | 4,780.18 | 26,655.73 |
| California | 1994 | 0.179637 | | | 4,920.94 | 27,393.89 |
| California | 1995 | 0.174071 | | | 4,991.82 | 28,677.00 |

Table 10 Continued

| State | Year | Fiscal Effort | 4th Math | 8th Math | Per-Pupil | GSP |
|---|---|---|---|---|---|---|
| California | 1996 | 0.170633 | 209 | 263 | 5,107.87 | 29,934.76 |
| California | 1997 | 0.170991 | | | 5,414.30 | 31,664.25 |
| California | 1998 | 0.176055 | | | 5,795.36 | 32,917.87 |
| California | 1999 | 0.171533 | | | 6,045.22 | 35,242.33 |
| California | 2000 | 0.169113 | 214 | 262 | 6,400.55 | 37,847.75 |
| California | 2001 | 0.187568 | | | 7,063.17 | 37,656.51 |
| California | 2002 | 0.194379 | | | 7,439.20 | 38,271.65 |
| California | 2003 | 0.191678 | 227 | 267 | 7,601.50 | 39,657.60 |
| California | 2004 | 0.182303 | | | 7,708.19 | 42,282.37 |
| California | 2005 | 0.178686 | 230 | 269 | 7,988.54 | 44,707.21 |
| California | 2006 | 0.17763 | | | 8,416.10 | 47,379.90 |
| California | 2007 | 0.220163 | 230 | 270 | 9,152.39 | 41,571.00 |
| California | 2008 | 0.231014 | | | 9,863.39 | 42,696.00 |
| California | 2009 | 0.228175 | 232 | 270 | 9,657.49 | 42,325.00 |
| Colorado | 1992 | 0.212432 | 221 | 272 | 5,171.75 | 24,345.39 |
| Colorado | 1993 | 0.200691 | 226 | 276 | 5,139.27 | 25,607.86 |
| Colorado | 1994 | 0.18901 | | | 5,097.27 | 26,968.17 |
| Colorado | 1995 | 0.192763 | | | 5,442.55 | 28,234.33 |
| Colorado | 1996 | 0.186513 | | | 5,521.44 | 29,603.53 |
| Colorado | 1997 | 0.179885 | | | 5,727.70 | 31,840.88 |
| Colorado | 1998 | 0.175385 | | | 6,099.18 | 34,775.94 |
| Colorado | 1999 | 0.172688 | | | 6,386.24 | 36,981.39 |
| Colorado | 2000 | 0.168746 | | | 6,701.71 | 39,714.76 |
| Colorado | 2001 | 0.176109 | | | 7,081.57 | 40,211.25 |
| Colorado | 2002 | 0.179943 | | | 7,283.64 | 40,477.57 |
| Colorado | 2003 | 0.189851 | 235 | 283 | 7,826.20 | 41,222.78 |
| Colorado | 2004 | 0.195053 | | | 8,415.74 | 43,145.96 |
| Colorado | 2005 | 0.186185 | 239 | 281 | 8,557.56 | 45,962.57 |
| Colorado | 2006 | 0.184342 | | | 8,938.25 | 48,487.21 |
| Colorado | 2007 | 0.198986 | 240 | 286 | 8,166.77 | 41,042.00 |
| Colorado | 2008 | 0.214234 | | | 9,078.58 | 42,377.00 |
| Colorado | 2009 | 0.210876 | 243 | 287 | 8,718.48 | 41,344.00 |
| Connecticut | 1992 | 0.253879 | 227 | 274 | 8,012.45 | 31,560.16 |
| Connecticut | 1993 | 0.248174 | | | 7,973.48 | 32,128.55 |
| Connecticut | 1994 | 0.25273 | | | 8,472.61 | 33,524.41 |
| Connecticut | 1995 | 0.242613 | | | 8,816.60 | 36,340.18 |
| Connecticut | 1996 | 0.232121 | 232 | 280 | 8,817.10 | 37,985.01 |
| Connecticut | 1997 | 0.216895 | | | 8,901.03 | 41,038.43 |
| Connecticut | 1998 | 0.213406 | | | 9,218.49 | 43,196.97 |
| Connecticut | 1999 | 0.216737 | | | 9,619.71 | 44,384.29 |

Table 10 Continued

| State | Year | Fiscal Effort | 4th Math | 8th Math | Per-Pupil | GSP |
|---|---|---|---|---|---|---|
| Connecticut | 2000 | 0.215296 | 234 | 282 | 10,121.86 | 47,013.68 |
| Connecticut | 2001 | 0.218954 | | | 10,524.54 | 48,067.39 |
| Connecticut | 2002 | 0.229493 | | | 11,021.80 | 48,026.75 |
| Connecticut | 2003 | 0.231664 | 241 | 284 | 11,301.73 | 48,784.92 |
| Connecticut | 2004 | 0.223364 | | | 11,754.97 | 52,626.97 |
| Connecticut | 2005 | 0.228959 | 242 | 281 | 12,655.36 | 55,273.50 |
| Connecticut | 2006 | 0.231117 | | | 13,461.17 | 58,243.97 |
| Connecticut | 2007 | 0.239838 | 243 | 282 | 12,979.33 | 54,117.00 |
| Connecticut | 2008 | 0.246195 | | | 13,848.00 | 56,248.00 |
| Connecticut | 2009 | 0.267131 | 245 | 289 | 14,531.12 | 54,397.00 |
| Delaware | 1992 | 0.183836 | 218 | 263 | 6,092.63 | 33,141.71 |
| Delaware | 1993 | 0.187865 | | | 6,273.89 | 33,395.72 |
| Delaware | 1994 | 0.189079 | | | 6,621.44 | 35,019.41 |
| Delaware | 1995 | 0.186488 | | | 7,029.57 | 37,694.56 |
| Delaware | 1996 | 0.18641 | 215 | 267 | 7,266.69 | 38,982.32 |
| Delaware | 1997 | 0.187551 | | | 7,803.88 | 41,609.50 |
| Delaware | 1998 | 0.165029 | | | 7,962.69 | 48,250.11 |
| Delaware | 1999 | 0.163808 | | | 8,336.14 | 50,889.69 |
| Delaware | 2000 | 0.167054 | | | 8,808.67 | 52,729.48 |
| Delaware | 2001 | 0.174904 | | | 9,720.05 | 55,573.57 |
| Delaware | 2002 | 0.17701 | | | 9,958.93 | 56,261.80 |
| Delaware | 2003 | 0.17245 | 236 | 277 | 10,257.36 | 59,480.13 |
| Delaware | 2004 | 0.174578 | | | 11,049.38 | 63,291.99 |
| Delaware | 2005 | 0.174639 | 240 | 281 | 11,770.21 | 67,397.22 |
| Delaware | 2006 | 0.174343 | | | 12,330.16 | 70,723.72 |
| Delaware | 2007 | 0.291296 | 242 | 283 | 11,828.96 | 40,608.00 |
| Delaware | 2008 | 0.299941 | | | 12,253.17 | 40,852.00 |
| Delaware | 2009 | 0.307839 | 239 | 284 | 12,257.22 | 39,817.00 |
| DC | 1992 | 0.3328 | 193 | 235 | 9,549.37 | 28,694.00 |
| DC | 1993 | 0.315212 | | | 9,419.49 | 29,883.00 |
| DC | 1994 | 0.330487 | | | 10,180.33 | 30,804.00 |
| DC | 1995 | 0.298324 | | | 9,334.86 | 31,291.00 |
| DC | 1996 | 0.290008 | 187 | 233 | 9,564.74 | 32,981.00 |
| DC | 1997 | 0.25911 | | | 9,018.85 | 34,807.00 |
| DC | 1998 | 0.252709 | | | 9,224.65 | 36,503.00 |
| DC | 1999 | 0.286059 | | | 10,610.79 | 37,093.00 |
| DC | 2000 | 0.294964 | 193 | 234 | 11,934.84 | 40,462.00 |
| DC | 2001 | 0.290709 | | | 13,204.29 | 45,421.00 |
| DC | 2002 | 0.314082 | | | 14,556.75 | 46,347.00 |
| DC | 2003 | 0.304124 | 205 | 243 | 14,735.09 | 48,451.00 |

Table 10 Continued

| State | Year | Fiscal Effort | 4th Math | 8th Math | Per-Pupil | GSP |
|---|---|---|---|---|---|---|
| DC | 2004 | 0.294371 | | | 15,413.88 | 52,362.00 |
| DC | 2005 | 0.267451 | 211 | 245 | 15,074.06 | 56,362.00 |
| DC | 2006 | 0.293265 | | | 17,876.55 | 60,957.00 |
| DC | 2007 | 0.234473 | 214 | 248 | 14,324.41 | 61,092.00 |
| DC | 2008 | 0.224559 | | | 14,594.34 | 64,991.00 |
| DC | 2009 | 0.248601 | 219 | 254 | 16,407.68 | 66,000.00 |
| Florida | 1992 | 0.252176 | 214 | 260 | 5,242.82 | 20,790.37 |
| Florida | 1993 | 0.245015 | | | 5,314.06 | 21,688.73 |
| Florida | 1994 | 0.243857 | | | 5,515.64 | 22,618.37 |
| Florida | 1995 | 0.244137 | | | 5,718.09 | 23,421.65 |
| Florida | 1996 | 0.241209 | 216 | 264 | 5,894.08 | 24,435.55 |
| Florida | 1997 | 0.236735 | | | 5,985.77 | 25,284.62 |
| Florida | 1998 | 0.229546 | | | 6,183.40 | 26,937.49 |
| Florida | 1999 | 0.229419 | | | 6,442.93 | 28,083.65 |
| Florida | 2000 | 0.217367 | | | 6,383.03 | 29,365.18 |
| Florida | 2001 | 0.217662 | | | 6,620.12 | 30,414.63 |
| Florida | 2002 | 0.21315 | | | 6,678.81 | 31,333.84 |
| Florida | 2003 | 0.210269 | 234 | 271 | 6,921.80 | 32,918.83 |
| Florida | 2004 | 0.207902 | | | 7,269.02 | 34,963.74 |
| Florida | 2005 | 0.206046 | 239 | 274 | 7,730.56 | 37,518.68 |
| Florida | 2006 | 0.212372 | | | 8,376.43 | 39,442.20 |
| Florida | 2007 | 0.221459 | 242 | 277 | 8,513.77 | 38,444.00 |
| Florida | 2008 | 0.231247 | | | 9,034.82 | 39,070.00 |
| Florida | 2009 | 0.231879 | 242 | 279 | 8,760.38 | 37,780.00 |
| Georgia | 1992 | 0.190357 | 216 | 259 | 4,419.23 | 23,215.53 |
| Georgia | 1993 | 0.193523 | | | 4,685.63 | 24,212.27 |
| Georgia | 1994 | 0.190911 | | | 4,914.87 | 25,744.27 |
| Georgia | 1995 | 0.191106 | | | 5,193.00 | 27,173.41 |
| Georgia | 1996 | 0.187502 | 215 | 262 | 5,377.49 | 28,679.65 |
| Georgia | 1997 | 0.190404 | | | 5,707.59 | 29,976.19 |
| Georgia | 1998 | 0.186388 | | | 6,058.73 | 32,505.99 |
| Georgia | 1999 | 0.189738 | | | 6,534.07 | 34,437.39 |
| Georgia | 2000 | 0.195325 | 220 | 266 | 6,903.24 | 35,342.35 |
| Georgia | 2001 | 0.209056 | | | 7,431.12 | 35,546.16 |
| Georgia | 2002 | 0.220627 | | | 7,869.55 | 35,669.06 |
| Georgia | 2003 | 0.22865 | 230 | 270 | 8,307.51 | 36,332.87 |
| Georgia | 2004 | 0.21909 | | | 8,278.50 | 37,785.82 |
| Georgia | 2005 | 0.218573 | 234 | 272 | 8,576.90 | 39,240.40 |
| Georgia | 2006 | 0.226079 | | | 9,163.68 | 40,533.15 |
| Georgia | 2007 | 0.272808 | 235 | 275 | 9,127.35 | 33,457.00 |

Table 10 Continued

| State | Year | Fiscal Effort | 4th Math | 8th Math | Per-Pupil | GSP |
|---|---|---|---|---|---|---|
| Georgia | 2008 | 0.288089 | | | 9,787.82 | 33,975.00 |
| Georgia | 2009 | 0.28563 | 236 | 278 | 9,650.28 | 33,786.00 |
| Hawaii | 1992 | 0.178376 | 214 | 257 | 5,419.89 | 30,384.61 |
| Hawaii | 1993 | 0.186209 | | | 5,704.36 | 30,634.24 |
| Hawaii | 1994 | 0.192564 | | | 5,879.07 | 30,530.44 |
| Hawaii | 1995 | 0.198909 | | | 6,078.02 | 30,556.78 |
| Hawaii | 1996 | 0.19709 | 215 | 262 | 6,051.28 | 30,703.09 |
| Hawaii | 1997 | 0.196287 | | | 6,143.57 | 31,298.90 |
| Hawaii | 1998 | 0.207414 | | | 6,408.81 | 30,898.60 |
| Hawaii | 1999 | 0.208313 | | | 6,648.02 | 31,913.58 |
| Hawaii | 2000 | 0.213773 | 216 | 263 | 7,090.17 | 33,166.87 |
| Hawaii | 2001 | 0.207534 | | | 7,106.06 | 34,240.50 |
| Hawaii | 2002 | 0.224637 | | | 7,919.17 | 35,253.22 |
| Hawaii | 2003 | 0.235218 | 227 | 266 | 8,769.83 | 37,283.86 |
| Hawaii | 2004 | 0.231635 | | | 9,340.65 | 40,324.82 |
| Hawaii | 2005 | 0.225598 | 230 | 266 | 9,704.61 | 43,017.31 |
| Hawaii | 2006 | 0.23693 | | | 10,746.57 | 45,357.52 |
| Hawaii | 2007 | 0.281871 | 234 | 269 | 11,060.34 | 39,239.00 |
| Hawaii | 2008 | 0.291429 | | | 11,799.97 | 40,490.00 |
| Hawaii | 2009 | 0.295163 | 236 | 274 | 12,399.50 | 42,009.00 |
| Idaho | 1992 | 0.187438 | 222 | 275 | 3,556.07 | 18,971.99 |
| Idaho | 1993 | 0.180281 | | | 3,690.27 | 20,469.57 |
| Idaho | 1994 | 0.177374 | | | 3,843.98 | 21,671.59 |
| Idaho | 1995 | 0.182895 | | | 4,209.78 | 23,017.49 |
| Idaho | 1996 | 0.190797 | | | 4,464.64 | 23,399.88 |
| Idaho | 1997 | 0.197808 | | | 4,731.85 | 23,921.47 |
| Idaho | 1998 | 0.210621 | | | 5,011.87 | 23,795.64 |
| Idaho | 1999 | 0.210144 | | | 5,378.99 | 25,596.66 |
| Idaho | 2000 | 0.209673 | 227 | 278 | 5,644.10 | 26,918.53 |
| Idaho | 2001 | 0.225389 | | | 6,077.31 | 26,963.64 |
| Idaho | 2002 | 0.234403 | | | 6,390.91 | 27,264.69 |
| Idaho | 2003 | 0.231354 | 235 | 280 | 6,454.22 | 27,897.63 |
| Idaho | 2004 | 0.214209 | | | 6,558.58 | 30,617.62 |
| Idaho | 2005 | 0.208628 | 242 | 281 | 6,698.19 | 32,105.82 |
| Idaho | 2006 | 0.201615 | | | 6,861.40 | 34,032.18 |
| Idaho | 2007 | 0.212367 | 241 | 284 | 6,625.22 | 31,197.00 |
| Idaho | 2008 | 0.215698 | | | 6,931.04 | 32,133.00 |
| Idaho | 2009 | 0.224191 | 241 | 287 | 7,091.62 | 31,632.00 |
| Illinois | 1992 | 0.218109 | | | 5,669.71 | 25,994.89 |
| Illinois | 1993 | 0.219589 | | | 5,898.36 | 26,860.91 |

Table 10 Continued

| State | Year | Fiscal Effort | 4th Math | 8th Math | Per-Pupil | GSP |
|---|---|---|---|---|---|---|
| Illinois | 1994 | 0.204458 | | | 5,893.21 | 28,823.55 |
| Illinois | 1995 | 0.204823 | | | 6,135.64 | 29,955.86 |
| Illinois | 1996 | 0.196582 | | | 6,128.31 | 31,174.28 |
| Illinois | 1997 | 0.199237 | | | 6,557.49 | 32,912.96 |
| Illinois | 1998 | 0.205896 | | | 7,111.40 | 34,538.81 |
| Illinois | 1999 | 0.213775 | | | 7,675.59 | 35,905.03 |
| Illinois | 2000 | 0.216658 | 225 | 277 | 8,083.88 | 37,311.72 |
| Illinois | 2001 | 0.227617 | | | 8,658.98 | 38,041.82 |
| Illinois | 2002 | 0.231856 | | | 8,967.36 | 38,676.37 |
| Illinois | 2003 | 0.230751 | 233 | 277 | 9,308.58 | 40,340.31 |
| Illinois | 2004 | 0.231009 | | | 9,709.54 | 42,031.07 |
| Illinois | 2005 | 0.230228 | 233 | 278 | 10,020.39 | 43,523.73 |
| Illinois | 2006 | 0.223787 | | | 10,282.49 | 45,947.58 |
| Illinois | 2007 | 0.236969 | 237 | 280 | 9,555.08 | 40,322.00 |
| Illinois | 2008 | 0.241678 | | | 10,246.44 | 42,397.00 |
| Illinois | 2009 | 0.261635 | 238 | 282 | 10,834.55 | 41,411.00 |
| Indiana | 1992 | 0.232985 | 221 | 270 | 5,073.52 | 21,776.19 |
| Indiana | 1993 | 0.234909 | | | 5,344.12 | 22,749.71 |
| Indiana | 1994 | 0.231074 | | | 5,630.02 | 24,364.61 |
| Indiana | 1995 | 0.230378 | | | 5,826.29 | 25,290.10 |
| Indiana | 1996 | 0.229384 | 229 | 276 | 6,039.95 | 26,331.13 |
| Indiana | 1997 | 0.239548 | | | 6,605.15 | 27,573.41 |
| Indiana | 1998 | 0.227531 | | | 6,785.82 | 29,823.73 |
| Indiana | 1999 | 0.235918 | | | 7,248.77 | 30,725.88 |
| Indiana | 2000 | 0.239788 | 234 | 283 | 7,652.08 | 31,911.86 |
| Indiana | 2001 | 0.255104 | | | 8,127.99 | 31,861.48 |
| Indiana | 2002 | 0.248202 | | | 8,267.69 | 33,310.33 |
| Indiana | 2003 | 0.246655 | 238 | 281 | 8,582.10 | 34,793.89 |
| Indiana | 2004 | 0.244827 | | | 9,033.23 | 36,896.33 |
| Indiana | 2005 | 0.255555 | 240 | 282 | 9,639.65 | 37,720.44 |
| Indiana | 2006 | 0.242423 | | | 9,557.71 | 39,425.71 |
| Indiana | 2007 | 0.265895 | 245 | 285 | 8,938.33 | 33,616.00 |
| Indiana | 2008 | 0.264966 | | | 9,036.14 | 34,103.00 |
| Indiana | 2009 | 0.277816 | 243 | 287 | 9,369.36 | 33,725.00 |
| Iowa | 1992 | 0.234251 | 230 | 283 | 5,096.02 | 21,754.53 |
| Iowa | 1993 | 0.237826 | | | 5,256.96 | 22,104.20 |
| Iowa | 1994 | 0.218019 | | | 5,288.45 | 24,256.81 |
| Iowa | 1995 | 0.218653 | | | 5,483.15 | 25,076.96 |
| Iowa | 1996 | 0.215196 | 229 | 284 | 5,771.74 | 26,820.83 |
| Iowa | 1997 | 0.213526 | | | 6,047.39 | 28,321.56 |

Table 10 Continued

| State | Year | Fiscal Effort | 4th Math | 8th Math | Per-Pupil | GSP |
|---|---|---|---|---|---|---|
| Iowa | 1998 | 0.21842 | | | 6,295.17 | 28,821.46 |
| Iowa | 1999 | 0.22186 | | | 6,548.13 | 29,514.67 |
| Iowa | 2000 | 0.224883 | 233 | | 6,925.00 | 30,793.84 |
| Iowa | 2001 | 0.234148 | | | 7,340.30 | 31,349.00 |
| Iowa | 2002 | 0.232565 | | | 7,713.57 | 33,167.36 |
| Iowa | 2003 | 0.228645 | 238 | 284 | 7,943.31 | 34,740.85 |
| Iowa | 2004 | 0.212125 | | | 8,016.67 | 37,792.19 |
| Iowa | 2005 | 0.210275 | 240 | 284 | 8,341.09 | 39,667.53 |
| Iowa | 2006 | 0.203495 | | | 8,459.61 | 41,571.58 |
| Iowa | 2007 | 0.250372 | 243 | 285 | 8,768.79 | 35,023.00 |
| Iowa | 2008 | 0.252652 | | | 9,267.27 | 36,680.00 |
| Iowa | 2009 | 0.264124 | 243 | 284 | 9,706.84 | 36,751.00 |
| Kansas | 1992 | 0.226077 | | | 5,007.47 | 22,149.40 |
| Kansas | 1993 | 0.240185 | | | 5,441.99 | 22,657.51 |
| Kansas | 1994 | 0.236296 | | | 5,659.44 | 23,950.66 |
| Kansas | 1995 | 0.237533 | | | 5,817.22 | 24,490.13 |
| Kansas | 1996 | 0.22971 | | | 5,971.28 | 25,994.87 |
| Kansas | 1997 | 0.223822 | | | 6,158.37 | 27,514.60 |
| Kansas | 1998 | 0.224248 | | | 6,406.08 | 28,566.89 |
| Kansas | 1999 | 0.228381 | | | 6,707.65 | 29,370.45 |
| Kansas | 2000 | 0.226401 | 232 | 284 | 6,962.15 | 30,751.44 |
| Kansas | 2001 | 0.240165 | | | 7,680.99 | 31,982.14 |
| Kansas | 2002 | 0.252837 | | | 8,342.21 | 32,994.42 |
| Kansas | 2003 | 0.244052 | 242 | 284 | 8,373.00 | 34,308.24 |
| Kansas | 2004 | 0.24322 | | | 8,804.25 | 36,198.73 |
| Kansas | 2005 | 0.236003 | 246 | 284 | 9,036.60 | 38,290.18 |
| Kansas | 2006 | 0.245109 | | | 9,905.10 | 40,410.99 |
| Kansas | 2007 | 0.244442 | 248 | 290 | 8,987.65 | 36,768.00 |
| Kansas | 2008 | 0.254531 | | | 9,666.56 | 37,978.00 |
| Kansas | 2009 | 0.262449 | 245 | 289 | 9,951.00 | 37,916.00 |
| Kentucky | 1992 | 0.232047 | 215 | 262 | 4,718.74 | 20,335.32 |
| Kentucky | 1993 | 0.231126 | | | 4,872.13 | 21,079.92 |
| Kentucky | 1994 | 0.227837 | | | 5,107.30 | 22,416.48 |
| Kentucky | 1995 | 0.224183 | | | 5,216.65 | 23,269.63 |
| Kentucky | 1996 | 0.228817 | 220 | 267 | 5,545.21 | 24,234.25 |
| Kentucky | 1997 | 0.230111 | | | 5,928.96 | 25,765.63 |
| Kentucky | 1998 | 0.224324 | | | 6,124.70 | 27,302.97 |
| Kentucky | 1999 | 0.230175 | | | 6,500.72 | 28,242.53 |
| Kentucky | 2000 | 0.245497 | 221 | 272 | 6,784.23 | 27,634.68 |
| Kentucky | 2001 | 0.253491 | | | 7,173.71 | 28,299.68 |

Table 10 Continued

| State | Year | Fiscal Effort | 4th Math | 8th Math | Per-Pupil | GSP |
|---|---|---|---|---|---|---|
| Kentucky | 2002 | 0.255234 | | | 7,535.70 | 29,524.74 |
| Kentucky | 2003 | 0.254608 | 229 | 274 | 7,728.42 | 30,354.19 |
| Kentucky | 2004 | 0.250381 | | | 7,972.60 | 31,841.88 |
| Kentucky | 2005 | 0.252217 | 231 | 274 | 8,378.76 | 33,220.47 |
| Kentucky | 2006 | 0.258617 | | | 8,974.50 | 34,701.96 |
| Kentucky | 2007 | 0.267069 | 235 | 279 | 8,308.78 | 31,111.00 |
| Kentucky | 2008 | 0.272917 | | | 8,685.84 | 31,826.00 |
| Kentucky | 2009 | 0.274618 | 239 | 279 | 8,755.63 | 31,883.00 |
| Louisiana | 1992 | 0.210147 | 204 | 250 | 4,352.34 | 20,710.91 |
| Louisiana | 1993 | 0.20499 | | | 4,428.18 | 21,601.89 |
| Louisiana | 1994 | 0.19273 | | | 4,519.27 | 23,448.75 |
| Louisiana | 1995 | 0.190975 | | | 4,760.58 | 24,927.73 |
| Louisiana | 1996 | 0.190837 | 209 | 252 | 4,987.63 | 26,135.53 |
| Louisiana | 1997 | 0.188862 | | | 5,200.68 | 27,536.99 |
| Louisiana | 1998 | 0.212216 | | | 5,643.60 | 26,593.66 |
| Louisiana | 1999 | 0.21645 | | | 6,019.09 | 27,808.17 |
| Louisiana | 2000 | 0.212589 | 218 | 259 | 6,255.64 | 29,425.92 |
| Louisiana | 2001 | 0.218778 | | | 6,552.88 | 29,952.14 |
| Louisiana | 2002 | 0.235042 | | | 7,061.33 | 30,042.88 |
| Louisiana | 2003 | 0.228795 | 226 | 266 | 7,491.80 | 32,744.58 |
| Louisiana | 2004 | 0.216878 | | | 7,846.22 | 36,178.08 |
| Louisiana | 2005 | 0.207145 | 230 | 268 | 8,287.75 | 40,009.49 |
| Louisiana | 2006 | 0.190219 | | | 8,568.20 | 45,043.95 |
| Louisiana | 2007 | 0.256881 | 230 | 272 | 8,928.14 | 34,756.00 |
| Louisiana | 2008 | 0.274437 | | | 9,954.12 | 36,271.00 |
| Louisiana | 2009 | 0.296638 | 229 | 272 | 10,532.73 | 35,507.00 |
| Maine | 1992 | 0.288775 | 232 | 279 | 5,651.65 | 19,571.13 |
| Maine | 1993 | 0.301626 | | | 6,073.06 | 20,134.40 |
| Maine | 1994 | 0.287789 | | | 6,068.61 | 21,086.99 |
| Maine | 1995 | 0.289112 | | | 6,428.23 | 22,234.37 |
| Maine | 1996 | 0.285522 | 232 | 284 | 6,545.88 | 22,926.04 |
| Maine | 1997 | 0.288271 | | | 6,879.54 | 23,864.86 |
| Maine | 1998 | 0.287213 | | | 7,238.00 | 25,200.79 |
| Maine | 1999 | 0.291949 | | | 7,688.39 | 26,334.69 |
| Maine | 2000 | 0.296412 | 231 | 284 | 8,246.75 | 27,821.90 |
| Maine | 2001 | 0.30763 | | | 8,878.91 | 28,862.29 |
| Maine | 2002 | 0.319534 | | | 9,517.15 | 29,784.46 |
| Maine | 2003 | 0.32926 | 238 | 282 | 10,113.93 | 30,717.19 |
| Maine | 2004 | 0.320002 | | | 10,504.43 | 32,826.17 |
| Maine | 2005 | 0.327388 | 241 | 281 | 11,152.69 | 34,065.63 |

Table 10 Continued

| State | Year | Fiscal Effort | 4th Math | 8th Math | Per-Pupil | GSP |
|---|---|---|---|---|---|---|
| Maine | 2006 | 0.330863 | | | 11,759.92 | 35,543.22 |
| Maine | 2007 | 0.337678 | 242 | 286 | 11,387.19 | 33,722.00 |
| Maine | 2008 | 0.327059 | | | 11,571.69 | 35,381.00 |
| Maine | 2009 | 0.334846 | 244 | 286 | 12,303.91 | 36,745.00 |
| Maryland | 1992 | 0.275275 | 217 | 265 | 6,678.90 | 24,262.66 |
| Maryland | 1993 | 0.271535 | | | 6,812.82 | 25,090.06 |
| Maryland | 1994 | 0.264656 | | | 6,957.58 | 26,289.15 |
| Maryland | 1995 | 0.267374 | | | 7,245.47 | 27,098.64 |
| Maryland | 1996 | 0.264077 | 221 | 270 | 7,382.49 | 27,955.87 |
| Maryland | 1997 | 0.2555 | | | 7,543.10 | 29,522.85 |
| Maryland | 1998 | 0.251048 | | | 7,812.19 | 31,118.29 |
| Maryland | 1999 | 0.241159 | | | 7,865.27 | 32,614.47 |
| Maryland | 2000 | 0.243638 | 222 | 276 | 8,273.12 | 33,956.58 |
| Maryland | 2001 | 0.246665 | | | 8,833.46 | 35,811.59 |
| Maryland | 2002 | 0.247009 | | | 9,265.99 | 37,512.76 |
| Maryland | 2003 | 0.253026 | 233 | 278 | 9,801.18 | 38,735.83 |
| Maryland | 2004 | 0.245716 | | | 10,139.61 | 41,265.57 |
| Maryland | 2005 | 0.246725 | 238 | 278 | 10,789.90 | 43,732.48 |
| Maryland | 2006 | 0.255261 | | | 11,718.92 | 45,909.46 |
| Maryland | 2007 | 0.254749 | 240 | 286 | 11,723.78 | 46,021.00 |
| Maryland | 2008 | 0.269616 | | | 12,966.11 | 48,091.00 |
| Maryland | 2009 | 0.278538 | 244 | 288 | 13,449.20 | 48,285.00 |
| Massachusetts | 1992 | 0.23192 | 227 | 273 | 6,408.39 | 27,631.95 |
| Massachusetts | 1993 | 0.231846 | | | 6,627.04 | 28,583.78 |
| Massachusetts | 1994 | 0.22888 | | | 6,959.43 | 30,406.51 |
| Massachusetts | 1995 | 0.22918 | | | 7,287.14 | 31,796.59 |
| Massachusetts | 1996 | 0.225887 | 229 | 278 | 7,613.49 | 33,704.89 |
| Massachusetts | 1997 | 0.218258 | | | 7,818.26 | 35,821.22 |
| Massachusetts | 1998 | 0.220488 | | | 8,299.43 | 37,641.12 |
| Massachusetts | 1999 | 0.218828 | | | 8,750.45 | 39,987.84 |
| Massachusetts | 2000 | 0.216946 | 235 | 283 | 9,374.95 | 43,213.28 |
| Massachusetts | 2001 | 0.230063 | | | 10,072.97 | 43,783.51 |
| Massachusetts | 2002 | 0.244424 | | | 10,808.27 | 44,219.42 |
| Massachusetts | 2003 | 0.244604 | 242 | 287 | 11,161.32 | 45,630.22 |
| Massachusetts | 2004 | 0.24087 | | | 11,582.55 | 48,086.27 |
| Massachusetts | 2005 | 0.245401 | 247 | 292 | 12,208.31 | 49,748.44 |
| Massachusetts | 2006 | 0.250332 | | | 13,127.53 | 52,440.56 |
| Massachusetts | 2007 | 0.259523 | 252 | 298 | 12,737.89 | 49,082.00 |
| Massachusetts | 2008 | 0.265191 | | | 13,454.47 | 50,735.00 |
| Massachusetts | 2009 | 0.283076 | 252 | 299 | 14,118.43 | 49,875.00 |

Table 10 Continued

| State | Year | Fiscal Effort | 4th Math | 8th Math | Per-Pupil | GSP |
|---|---|---|---|---|---|---|
| Michigan | 1992 | 0.286511 | 220 | 267 | 6,268.16 | 21,877.58 |
| Michigan | 1993 | 0.280015 | | | 6,494.31 | 23,192.70 |
| Michigan | 1994 | 0.259701 | | | 6,658.13 | 25,637.71 |
| Michigan | 1995 | 0.26962 | | | 6,994.40 | 25,941.66 |
| Michigan | 1996 | 0.265002 | 226 | 277 | 7,165.58 | 27,039.72 |
| Michigan | 1997 | 0.266242 | | | 7,567.73 | 28,424.26 |
| Michigan | 1998 | 0.245608 | | | 7,717.22 | 31,420.88 |
| Michigan | 1999 | 0.247074 | | | 8,142.15 | 32,954.35 |
| Michigan | 2000 | 0.262351 | 231 | 278 | 8,885.86 | 33,870.20 |
| Michigan | 2001 | 0.270126 | | | 9,030.60 | 33,431.06 |
| Michigan | 2002 | 0.270537 | | | 9,428.41 | 34,850.69 |
| Michigan | 2003 | 0.276127 | 236 | 276 | 9,846.53 | 35,659.41 |
| Michigan | 2004 | 0.279118 | | | 10,048.72 | 36,001.75 |
| Michigan | 2005 | 0.280315 | 238 | 277 | 10,327.73 | 36,843.30 |
| Michigan | 2006 | 0.280829 | | | 10,598.31 | 37,739.35 |
| Michigan | 2007 | 0.282508 | 238 | 277 | 9,912.08 | 35,086.00 |
| Michigan | 2008 | 0.28524 | | | 10,068.67 | 35,299.00 |
| Michigan | 2009 | 0.308093 | 236 | 278 | 10,482.86 | 34,025.00 |
| Minnesota | 1992 | 0.217259 | 228 | 282 | 5,408.75 | 24,895.39 |
| Minnesota | 1993 | 0.220134 | | | 5,553.94 | 25,229.84 |
| Minnesota | 1994 | 0.211403 | | | 5,719.51 | 27,054.97 |
| Minnesota | 1995 | 0.212847 | | | 5,999.53 | 28,187.11 |
| Minnesota | 1996 | 0.204998 | 232 | 284 | 6,162.08 | 30,059.24 |
| Minnesota | 1997 | 0.199353 | | | 6,371.20 | 31,959.38 |
| Minnesota | 1998 | 0.198345 | | | 6,794.86 | 34,257.82 |
| Minnesota | 1999 | 0.2025 | | | 7,183.16 | 35,472.39 |
| Minnesota | 2000 | 0.199915 | 235 | 288 | 7,499.14 | 37,511.69 |
| Minnesota | 2001 | 0.208639 | | | 7,960.44 | 38,154.17 |
| Minnesota | 2002 | 0.203719 | | | 8,050.45 | 39,517.41 |
| Minnesota | 2003 | 0.205106 | 242 | 291 | 8,440.14 | 41,150.04 |
| Minnesota | 2004 | 0.204441 | | | 8,934.34 | 43,701.36 |
| Minnesota | 2005 | 0.20541 | 246 | 290 | 9,272.84 | 45,143.12 |
| Minnesota | 2006 | 0.206234 | | | 9,760.55 | 47,327.51 |
| Minnesota | 2007 | 0.232476 | 247 | 292 | 9,539.40 | 41,034.00 |
| Minnesota | 2008 | 0.237077 | | | 10,140.24 | 42,772.00 |
| Minnesota | 2009 | 0.267079 | 249 | 294 | 11,097.67 | 41,552.00 |
| Mississippi | 1992 | 0.194951 | 202 | 246 | 3,245.25 | 16,646.50 |
| Mississippi | 1993 | 0.192233 | | | 3,382.38 | 17,595.19 |
| Mississippi | 1994 | 0.19436 | | | 3,660.39 | 18,833.08 |
| Mississippi | 1995 | 0.206405 | | | 4,079.80 | 19,765.97 |

Table 10 Continued

| State | Year | Fiscal Effort | 4th Math | 8th Math | Per-Pupil | GSP |
|---|---|---|---|---|---|---|
| Mississippi | 1996 | 0.208574 | 208 | 250 | 4,250.06 | 20,376.74 |
| Mississippi | 1997 | 0.205484 | | | 4,312.27 | 20,985.93 |
| Mississippi | 1998 | 0.212051 | | | 4,574.91 | 21,574.54 |
| Mississippi | 1999 | 0.218569 | | | 4,871.19 | 22,286.74 |
| Mississippi | 2000 | 0.237387 | 211 | 254 | 5,355.51 | 22,560.29 |
| Mississippi | 2001 | 0.239655 | | | 5,534.76 | 23,094.71 |
| Mississippi | 2002 | 0.240305 | | | 5,719.47 | 23,800.85 |
| Mississippi | 2003 | 0.246064 | 223 | 261 | 6,186.26 | 25,140.81 |
| Mississippi | 2004 | 0.249507 | | | 6,601.44 | 26,457.93 |
| Mississippi | 2005 | 0.254954 | 227 | 262 | 6,993.91 | 27,432.05 |
| Mississippi | 2006 | 0.266064 | | | 7,699.35 | 28,937.93 |
| Mississippi | 2007 | 0.259089 | 228 | 265 | 7,473.42 | 28,845.00 |
| Mississippi | 2008 | 0.267205 | | | 7,901.00 | 29,569.00 |
| Mississippi | 2009 | 0.268238 | 227 | 265 | 8,074.76 | 30,103.00 |
| Missouri | 1992 | 0.218717 | 222 | 271 | 4,829.91 | 22,082.95 |
| Missouri | 1993 | 0.217629 | | | 4,885.17 | 22,447.18 |
| Missouri | 1994 | 0.211938 | | | 5,113.78 | 24,128.66 |
| Missouri | 1995 | 0.210519 | | | 5,383.20 | 25,571.16 |
| Missouri | 1996 | 0.21068 | 225 | 273 | 5,625.99 | 26,703.96 |
| Missouri | 1997 | 0.206637 | | | 5,822.99 | 28,179.81 |
| Missouri | 1998 | 0.204917 | | | 6,096.09 | 29,749.00 |
| Missouri | 1999 | 0.210435 | | | 6,393.32 | 30,381.44 |
| Missouri | 2000 | 0.21461 | 229 | 274 | 6,764.14 | 31,518.24 |
| Missouri | 2001 | 0.224804 | | | 7,264.57 | 32,315.17 |
| Missouri | 2002 | 0.232203 | | | 7,699.58 | 33,158.88 |
| Missouri | 2003 | 0.233754 | 235 | 279 | 8,001.93 | 34,232.29 |
| Missouri | 2004 | 0.225404 | | | 8,021.67 | 35,588.03 |
| Missouri | 2005 | 0.225356 | 235 | 276 | 8,359.88 | 37,096.24 |
| Missouri | 2006 | 0.228514 | | | 8,834.21 | 38,659.44 |
| Missouri | 2007 | 0.248027 | 239 | 281 | 8,529.39 | 34,389.00 |
| Missouri | 2008 | 0.261616 | | | 9,216.20 | 35,228.00 |
| Missouri | 2009 | 0.26711 | 241 | 286 | 9,529.40 | 35,676.00 |
| Montana | 1992 | 0.292001 | | | 5,319.36 | 18,216.94 |
| Montana | 1993 | 0.284459 | | | 5,425.44 | 19,072.85 |
| Montana | 1994 | 0.284259 | | | 5,597.69 | 19,692.19 |
| Montana | 1995 | 0.286856 | | | 5,691.94 | 19,842.50 |
| Montana | 1996 | 0.287895 | 228 | 283 | 5,846.55 | 20,307.95 |
| Montana | 1997 | 0.289766 | | | 6,111.74 | 21,091.96 |
| Montana | 1998 | 0.289397 | | | 6,447.97 | 22,280.71 |
| Montana | 1999 | 0.297709 | | | 6,768.47 | 22,735.20 |

Table 10 Continued

| State | Year | Fiscal Effort | 4th Math | 8th Math | Per-Pupil | GSP |
|---|---|---|---|---|---|---|
| Montana | 2000 | 0.295596 | 230 | 287 | 6,990.02 | 23,647.22 |
| Montana | 2001 | 0.301795 | | | 7,484.02 | 24,798.38 |
| Montana | 2002 | 0.303747 | | | 7,860.96 | 25,879.96 |
| Montana | 2003 | 0.301502 | 236 | 286 | 8,390.98 | 27,830.57 |
| Montana | 2004 | 0.292356 | | | 8,770.57 | 29,999.62 |
| Montana | 2005 | 0.284605 | 241 | 286 | 9,108.40 | 32,003.65 |
| Montana | 2006 | 0.282109 | | | 9,652.78 | 34,216.50 |
| Montana | 2007 | 0.279673 | 244 | 287 | 9,077.61 | 32,458.00 |
| Montana | 2008 | 0.282175 | | | 9,666.18 | 34,256.00 |
| Montana | 2009 | 0.295825 | 244 | 292 | 10,059.25 | 34,004.00 |
| Nebraska | 1992 | 0.223533 | 225 | 278 | 5,263.48 | 23,546.76 |
| Nebraska | 1993 | 0.221876 | | | 5,336.47 | 24,051.58 |
| Nebraska | 1994 | 0.2162 | | | 5,650.60 | 26,136.01 |
| Nebraska | 1995 | 0.22097 | | | 5,935.01 | 26,858.91 |
| Nebraska | 1996 | 0.210719 | 228 | 283 | 6,082.96 | 28,867.69 |
| Nebraska | 1997 | 0.219074 | | | 6,471.85 | 29,541.90 |
| Nebraska | 1998 | 0.214408 | | | 6,584.16 | 30,708.52 |
| Nebraska | 1999 | 0.218857 | | | 6,855.97 | 31,326.33 |
| Nebraska | 2000 | 0.2273 | 226 | 281 | 7,359.60 | 32,378.40 |
| Nebraska | 2001 | 0.230129 | | | 7,688.03 | 33,407.49 |
| Nebraska | 2002 | 0.237374 | | | 8,237.67 | 34,703.31 |
| Nebraska | 2003 | 0.2298 | 236 | 282 | 8,550.02 | 37,206.31 |
| Nebraska | 2004 | 0.238233 | | | 9,269.77 | 38,910.58 |
| Nebraska | 2005 | 0.234566 | 238 | 284 | 9,638.18 | 41,089.48 |
| Nebraska | 2006 | 0.23756 | | | 10,169.63 | 42,808.73 |
| Nebraska | 2007 | 0.250648 | 238 | 284 | 9,141.40 | 36,471.00 |
| Nebraska | 2008 | 0.253829 | | | 9,576.96 | 37,730.00 |
| Nebraska | 2009 | 0.263785 | 239 | 284 | 10,045.19 | 38,081.00 |
| Nevada | 1992 | 0.182354 | | | 4,925.74 | 27,011.91 |
| Nevada | 1993 | 0.178549 | | | 5,065.66 | 28,371.30 |
| Nevada | 1994 | 0.168859 | | | 5,051.82 | 29,917.33 |
| Nevada | 1995 | 0.166644 | | | 5,160.19 | 30,965.28 |
| Nevada | 1996 | 0.163912 | 218 | | 5,320.20 | 32,457.75 |
| Nevada | 1997 | 0.165808 | | | 5,540.60 | 33,415.83 |
| Nevada | 1998 | 0.167672 | | | 5,757.54 | 34,338.07 |
| Nevada | 1999 | 0.166773 | | | 5,934.10 | 35,581.93 |
| Nevada | 2000 | 0.168327 | 220 | 268 | 6,147.72 | 36,522.47 |
| Nevada | 2001 | 0.166776 | | | 6,150.48 | 36,878.64 |
| Nevada | 2002 | 0.172884 | | | 6,477.47 | 37,467.23 |
| Nevada | 2003 | 0.165767 | 228 | 268 | 6,496.30 | 39,189.21 |

Table 10 Continued

| State | Year | Fiscal Effort | 4th Math | 8th Math | Per-Pupil | GSP |
|---|---|---|---|---|---|---|
| Nebraska | 2004 | 0.238233 | | | 9,269.77 | 38,910.58 |
| Nebraska | 2005 | 0.234566 | 238 | 284 | 9,638.18 | 41,089.48 |
| Nebraska | 2006 | 0.23756 | | | 10,169.63 | 42,808.73 |
| Nebraska | 2007 | 0.250648 | 238 | 284 | 9,141.40 | 36,471.00 |
| Nebraska | 2008 | 0.253829 | | | 9,576.96 | 37,730.00 |
| Nebraska | 2009 | 0.263785 | 239 | 284 | 10,045.19 | 38,081.00 |
| Nevada | 1992 | 0.182354 | | | 4,925.74 | 27,011.91 |
| Nevada | 1993 | 0.178549 | | | 5,065.66 | 28,371.30 |
| Nevada | 1994 | 0.168859 | | | 5,051.82 | 29,917.33 |
| Nevada | 1995 | 0.166644 | | | 5,160.19 | 30,965.28 |
| Nevada | 1996 | 0.163912 | 218 | | 5,320.20 | 32,457.75 |
| Nevada | 1997 | 0.165808 | | | 5,540.60 | 33,415.83 |
| Nevada | 1998 | 0.167672 | | | 5,757.54 | 34,338.07 |
| Nevada | 1999 | 0.166773 | | | 5,934.10 | 35,581.93 |
| Nevada | 2000 | 0.168327 | 220 | 268 | 6,147.72 | 36,522.47 |
| Nevada | 2001 | 0.166776 | | | 6,150.48 | 36,878.64 |
| Nevada | 2002 | 0.172884 | | | 6,477.47 | 37,467.23 |
| Nevada | 2003 | 0.165767 | 228 | 268 | 6,496.30 | 39,189.21 |
| Nevada | 2004 | 0.159183 | | | 6,779.69 | 42,590.65 |
| Nevada | 2005 | 0.157631 | 230 | 270 | 7,198.21 | 45,665.11 |
| Nevada | 2006 | 0.162709 | | | 7,719.63 | 47,444.45 |
| Nevada | 2007 | 0.197451 | 232 | 271 | 7,992.81 | 40,480.00 |
| Nevada | 2008 | 0.205308 | | | 8,284.80 | 40,353.00 |
| Nevada | 2009 | 0.218311 | 235 | 274 | 8,422.02 | 38,578.00 |
| New Hampshire | 1992 | 0.243732 | 230 | 278 | 5,790.31 | 23,756.83 |
| New Hampshire | 1993 | 0.230883 | | | 5,644.43 | 24,447.12 |
| New Hampshire | 1994 | 0.222002 | | | 5,723.37 | 25,780.70 |
| New Hampshire | 1995 | 0.210956 | | | 5,858.88 | 27,773.05 |
| New Hampshire | 1996 | 0.200986 | | | 5,957.97 | 29,643.69 |
| New Hampshire | 1997 | 0.199731 | | | 6,235.97 | 31,221.81 |
| New Hampshire | 1998 | 0.200077 | | | 6,487.41 | 32,424.50 |
| New Hampshire | 1999 | 0.206029 | | | 6,779.64 | 32,906.33 |
| New Hampshire | 2000 | 0.201916 | | | 7,082.49 | 35,076.38 |
| New Hampshire | 2001 | 0.217573 | | | 7,655.62 | 35,186.52 |
| New Hampshire | 2002 | 0.227013 | | | 8,230.39 | 36,255.17 |
| New Hampshire | 2003 | 0.237445 | 243 | 286 | 8,899.78 | 37,481.39 |
| New Hampshire | 2004 | 0.235962 | | | 9,390.76 | 39,797.81 |
| New Hampshire | 2005 | 0.242518 | 246 | 285 | 10,043.35 | 41,412.77 |
| New Hampshire | 2006 | 0.249963 | | | 10,698.13 | 42,798.85 |
| New Hampshire | 2007 | 0.258303 | 249 | 288 | 10,722.67 | 41,512.00 |

Table 10 Continued

| State | Year | Fiscal Effort | 4th Math | 8th Math | Per-Pupil | GSP |
|---|---|---|---|---|---|---|
| New Hampshire | 2008 | 0.271273 | | | 11,618.62 | 42,830.00 |
| New Hampshire | 2009 | 0.278591 | 251 | 292 | 11,932.33 | 42,831.00 |
| New Jersey | 1992 | 0.31492 | 227 | 272 | 9,317.23 | 29,586.04 |
| New Jersey | 1993 | 0.307485 | | | 9,415.21 | 30,620.03 |
| New Jersey | 1994 | 0.304686 | | | 9,677.27 | 31,761.45 |
| New Jersey | 1995 | 0.296221 | | | 9,774.46 | 32,997.16 |
| New Jersey | 1996 | 0.287902 | 227 | | 9,955.40 | 34,579.14 |
| New Jersey | 1997 | 0.283389 | | | 10,211.12 | 36,032.11 |
| New Jersey | 1998 | 0.269975 | | | 10,232.83 | 37,902.88 |
| New Jersey | 1999 | 0.274553 | | | 10,748.27 | 39,148.20 |
| New Jersey | 2000 | 0.26667 | | | 10,902.51 | 40,883.94 |
| New Jersey | 2001 | 0.275404 | | | 11,751.94 | 42,671.64 |
| New Jersey | 2002 | 0.280676 | | | 12,197.35 | 43,457.11 |
| New Jersey | 2003 | 0.290497 | 239 | 281 | 13,092.97 | 45,070.91 |
| New Jersey | 2004 | 0.292111 | | | 13,775.99 | 47,160.18 |
| New Jersey | 2005 | 0.298469 | 244 | 284 | 14,666.14 | 49,137.84 |
| New Jersey | 2006 | 0.295746 | | | 15,361.83 | 51,942.68 |
| New Jersey | 2007 | 0.318956 | 249 | 289 | 15,690.70 | 49,194.00 |
| New Jersey | 2008 | 0.323865 | | | 16,490.89 | 50,919.00 |
| New Jersey | 2009 | 0.323397 | 247 | 293 | 16,271.06 | 50,313.00 |
| New Mexico | 1992 | 0.184371 | 213 | 260 | 3,765.09 | 20,421.30 |
| New Mexico | 1993 | 0.182301 | | | 4,071.11 | 22,331.84 |
| New Mexico | 1994 | 0.174232 | | | 4,260.84 | 24,454.97 |
| New Mexico | 1995 | 0.190304 | | | 4,586.05 | 24,098.55 |
| New Mexico | 1996 | 0.184099 | 214 | 262 | 4,586.71 | 24,914.31 |
| New Mexico | 1997 | 0.174412 | | | 4,673.58 | 26,796.23 |
| New Mexico | 1998 | 0.194649 | | | 4,983.54 | 25,602.68 |
| New Mexico | 1999 | 0.197913 | | | 5,363.44 | 27,099.99 |
| New Mexico | 2000 | 0.209543 | 214 | 260 | 5,834.85 | 27,845.54 |
| New Mexico | 2001 | 0.225543 | | | 6,320.25 | 28,022.41 |
| New Mexico | 2002 | 0.243314 | | | 6,886.25 | 28,301.89 |
| New Mexico | 2003 | 0.232811 | 223 | 263 | 7,125.82 | 30,607.72 |
| New Mexico | 2004 | 0.227761 | | | 7,652.79 | 33,600.09 |
| New Mexico | 2005 | 0.219221 | 224 | 263 | 7,932.53 | 36,185.12 |
| New Mexico | 2006 | 0.216959 | | | 8,425.96 | 38,836.61 |
| New Mexico | 2007 | 0.274355 | 228 | 268 | 8,635.06 | 31,474.00 |
| New Mexico | 2008 | 0.282578 | | | 9,068.21 | 32,091.00 |
| New Mexico | 2009 | 0.286108 | 230 | 270 | 9,439.27 | 32,992.00 |
| New York | 1992 | 0.292137 | 218 | 266 | 8,527.42 | 29,189.79 |
| New York | 1993 | 0.29784 | | | 8,902.47 | 29,890.09 |

Table 10 Continued

| State | Year | Fiscal Effort | 4th Math | 8th Math | Per-Pupil | GSP |
|---|---|---|---|---|---|---|
| New York | 1994 | 0.297438 | | | 9,174.73 | 30,845.85 |
| New York | 1995 | 0.29988 | | | 9,623.23 | 32,090.30 |
| New York | 1996 | 0.281746 | 223 | 270 | 9,548.98 | 33,892.16 |
| New York | 1997 | 0.269694 | | | 9,657.75 | 35,810.06 |
| New York | 1998 | 0.272216 | | | 9,969.51 | 36,623.45 |
| New York | 1999 | 0.271862 | | | 10,514.32 | 38,675.19 |
| New York | 2000 | 0.267871 | 227 | 276 | 10,956.64 | 40,902.71 |
| New York | 2001 | 0.280739 | | | 11,886.91 | 42,341.53 |
| New York | 2002 | 0.287963 | | | 12,342.92 | 42,862.80 |
| New York | 2003 | 0.298927 | 236 | 280 | 13,211.19 | 44,195.44 |
| New York | 2004 | 0.295765 | | | 13,925.57 | 47,083.26 |
| New York | 2005 | 0.302465 | 238 | 280 | 15,054.33 | 49,772.15 |
| New York | 2006 | 0.304055 | | | 16,094.72 | 52,933.51 |
| New York | 2007 | 0.337262 | 243 | 280 | 15,981.17 | 47,385.00 |
| New York | 2008 | 0.357214 | | | 17,173.43 | 48,076.00 |
| New York | 2009 | 0.386013 | 241 | 283 | 18,126.02 | 46,957.00 |
| North Carolina | 1992 | 0.197261 | 213 | 258 | 4,554.43 | 23,088.31 |
| North Carolina | 1993 | 0.200623 | | | 4,762.89 | 23,740.50 |
| North Carolina | 1994 | 0.195895 | | | 4,894.36 | 24,984.56 |
| North Carolina | 1995 | 0.194629 | | | 5,076.73 | 26,084.07 |
| North Carolina | 1996 | 0.189639 | 224 | 268 | 5,090.20 | 26,841.47 |
| North Carolina | 1997 | 0.186381 | | | 5,315.21 | 28,517.96 |
| North Carolina | 1998 | 0.182198 | | | 5,667.28 | 31,105.17 |
| North Carolina | 1999 | 0.18424 | | | 6,087.98 | 33,043.66 |
| North Carolina | 2000 | 0.192014 | 232 | 280 | 6,505.06 | 33,878.09 |
| North Carolina | 2001 | 0.195682 | | | 6,817.06 | 34,837.44 |
| North Carolina | 2002 | 0.19548 | | | 6,970.24 | 35,657.09 |
| North Carolina | 2003 | 0.194084 | 230 | 281 | 7,057.42 | 36,362.71 |
| North Carolina | 2004 | 0.186968 | | | 7,114.50 | 38,051.87 |
| North Carolina | 2005 | 0.188626 | 242 | 282 | 7,627.74 | 40,438.36 |
| North Carolina | 2006 | 0.187769 | | | 7,940.41 | 42,288.13 |
| North Carolina | 2007 | 0.234373 | 241 | 284 | 7,883.36 | 33,636.00 |
| North Carolina | 2008 | 0.232168 | | | 7,995.65 | 34,439.00 |
| North Carolina | 2009 | 0.249242 | 244 | 284 | 8,587.14 | 34,453.00 |
| North Dakota | 1992 | 0.221624 | 229 | 283 | 4,440.66 | 20,036.88 |
| North Dakota | 1993 | 0.22839 | | | 4,597.25 | 20,128.94 |
| North Dakota | 1994 | 0.214705 | | | 4,673.68 | 21,767.86 |
| North Dakota | 1995 | 0.213108 | | | 4,774.79 | 22,405.50 |
| North Dakota | 1996 | 0.201462 | 231 | 284 | 4,979.38 | 24,716.24 |
| North Dakota | 1997 | 0.210193 | | | 5,197.91 | 24,729.27 |

Table 10 Continued

| State | Year | Fiscal Effort | 4th Math | 8th Math | Per-Pupil | GSP |
|---|---|---|---|---|---|---|
| North Dakota | 1998 | 0.204675 | | | 5,353.22 | 26,154.69 |
| North Dakota | 1999 | 0.222496 | | | 5,820.21 | 26,158.73 |
| North Dakota | 2000 | 0.219537 | 231 | 283 | 6,078.08 | 27,685.89 |
| North Dakota | 2001 | 0.222122 | | | 6,466.97 | 29,114.53 |
| North Dakota | 2002 | 0.226698 | | | 7,112.38 | 31,373.84 |
| North Dakota | 2003 | 0.213536 | 239 | 287 | 7,315.22 | 34,257.53 |
| North Dakota | 2004 | 0.21701 | | | 7,752.44 | 35,723.95 |
| North Dakota | 2005 | 0.22335 | 243 | 287 | 8,775.90 | 39,292.16 |
| North Dakota | 2006 | 0.222655 | | | 9,238.98 | 41,494.53 |
| North Dakota | 2007 | 0.258897 | 245 | 292 | 9,021.54 | 34,846.00 |
| North Dakota | 2008 | 0.246055 | | | 9,675.11 | 39,321.00 |
| North Dakota | 2009 | 0.256785 | 245 | 293 | 10,150.70 | 39,530.00 |
| Ohio | 1992 | 0.251057 | 219 | 268 | 5,694.35 | 22,681.50 |
| Ohio | 1993 | 0.247316 | | | 5,754.26 | 23,266.80 |
| Ohio | 1994 | 0.239106 | | | 5,971.15 | 24,972.80 |
| Ohio | 1995 | 0.235377 | | | 6,161.58 | 26,177.50 |
| Ohio | 1996 | 0.230666 | | | 6,266.07 | 27,165.14 |
| Ohio | 1997 | 0.225872 | | | 6,516.54 | 28,850.64 |
| Ohio | 1998 | 0.220816 | | | 6,807.53 | 30,828.97 |
| Ohio | 1999 | 0.228035 | | | 7,254.45 | 31,812.93 |
| Ohio | 2000 | 0.238785 | 231 | 283 | 7,816.47 | 32,734.33 |
| Ohio | 2001 | 0.255477 | | | 8,403.41 | 32,893.05 |
| Ohio | 2002 | 0.261455 | | | 8,927.92 | 34,147.07 |
| Ohio | 2003 | 0.26795 | 238 | 282 | 9,426.81 | 35,181.17 |
| Ohio | 2004 | 0.264522 | | | 9,798.68 | 37,042.94 |
| Ohio | 2005 | 0.258956 | 242 | 283 | 9,983.84 | 38,554.19 |
| Ohio | 2006 | 0.256423 | | | 10,305.65 | 40,190.08 |
| Ohio | 2007 | 0.28098 | 245 | 285 | 9,798.88 | 34,874.00 |
| Ohio | 2008 | 0.286475 | | | 10,173.02 | 35,511.00 |
| Ohio | 2009 | 0.298468 | 244 | 286 | 10,560.10 | 35,381.00 |
| Oklahoma | 1992 | 0.211904 | 220 | 268 | 4,076.39 | 19,236.97 |
| Oklahoma | 1993 | 0.217928 | | | 4,355.50 | 19,985.95 |
| Oklahoma | 1994 | 0.231342 | | | 4,733.89 | 20,462.73 |
| Oklahoma | 1995 | 0.230376 | | | 4,845.39 | 21,032.53 |
| Oklahoma | 1996 | 0.217543 | | | 4,880.60 | 22,435.06 |
| Oklahoma | 1997 | 0.218625 | | | 5,150.17 | 23,557.06 |
| Oklahoma | 1998 | 0.231274 | | | 5,388.69 | 23,299.99 |
| Oklahoma | 1999 | 0.234768 | | | 5,684.19 | 24,211.94 |
| Oklahoma | 2000 | 0.222061 | 225 | 272 | 5,769.70 | 25,982.57 |
| Oklahoma | 2001 | 0.23734 | | | 6,458.06 | 27,210.13 |

Table 10 Continued

| State | Year | Fiscal Effort | 4th Math | 8th Math | Per-Pupil | GSP |
|---|---|---|---|---|---|---|
| Oklahoma | 2002 | 0.239517 | | | 6,671.69 | 27,854.80 |
| Oklahoma | 2003 | 0.221526 | 229 | 272 | 6,539.68 | 29,521.05 |
| Oklahoma | 2004 | 0.208678 | | | 6,598.90 | 31,622.33 |
| Oklahoma | 2005 | 0.206569 | 234 | 271 | 7,086.36 | 34,305.06 |
| Oklahoma | 2006 | 0.198006 | | | 7,449.04 | 37,620.29 |
| Oklahoma | 2007 | 0.217248 | 237 | 275 | 7,419.66 | 34,153.00 |
| Oklahoma | 2008 | 0.208275 | | | 7,685.12 | 36,899.00 |
| Oklahoma | 2009 | 0.22357 | 237 | 276 | 7,884.87 | 35,268.00 |
| Oregon | 1992 | 0.277641 | | | 5,912.60 | 21,295.86 |
| Oregon | 1993 | 0.278603 | | | 6,296.03 | 22,598.60 |
| Oregon | 1994 | 0.262623 | | | 6,262.95 | 23,847.71 |
| Oregon | 1995 | 0.25588 | | | 6,436.35 | 25,153.81 |
| Oregon | 1996 | 0.235607 | 223 | 276 | 6,614.91 | 28,076.03 |
| Oregon | 1997 | 0.230199 | | | 6,792.38 | 29,506.61 |
| Oregon | 1998 | 0.244002 | | | 7,347.55 | 30,112.61 |
| Oregon | 1999 | 0.253479 | | | 7,787.48 | 30,722.40 |
| Oregon | 2000 | 0.248084 | 227 | 281 | 8,128.76 | 32,766.14 |
| Oregon | 2001 | 0.267653 | | | 8,545.04 | 31,925.78 |
| Oregon | 2002 | 0.262465 | | | 8,725.01 | 33,242.52 |
| Oregon | 2003 | 0.249249 | 236 | 281 | 8,513.58 | 34,156.90 |
| Oregon | 2004 | 0.229673 | | | 8,639.62 | 37,617.07 |
| Oregon | 2005 | 0.225757 | 238 | 282 | 8,799.24 | 38,976.65 |
| Oregon | 2006 | 0.227322 | | | 9,293.78 | 40,883.79 |
| Oregon | 2007 | 0.258752 | 236 | 284 | 9,000.43 | 34,784.00 |
| Oregon | 2008 | 0.265825 | | | 9,558.00 | 35,956.00 |
| Oregon | 2009 | 0.274908 | 238 | 285 | 9,805.14 | 35,667.00 |
| Pennsylvania | 1992 | 0.291353 | 224 | 271 | 6,613.49 | 22,699.21 |
| Pennsylvania | 1993 | 0.29298 | | | 6,889.70 | 23,515.96 |
| Pennsylvania | 1994 | 0.284769 | | | 6,982.94 | 24,521.43 |
| Pennsylvania | 1995 | 0.275736 | | | 7,109.14 | 25,782.39 |
| Pennsylvania | 1996 | 0.281247 | 226 | | 7,491.53 | 26,636.88 |
| Pennsylvania | 1997 | 0.274801 | | | 7,685.52 | 27,967.55 |
| Pennsylvania | 1998 | 0.263208 | | | 7,776.50 | 29,545.13 |
| Pennsylvania | 1999 | 0.261695 | | | 8,025.76 | 30,668.38 |
| Pennsylvania | 2000 | 0.264279 | | | 8,380.32 | 31,710.10 |
| Pennsylvania | 2001 | 0.26747 | | | 8,847.11 | 33,077.05 |
| Pennsylvania | 2002 | 0.267792 | | | 9,195.65 | 34,338.76 |
| Pennsylvania | 2003 | 0.270388 | 236 | 279 | 9,647.59 | 35,680.54 |
| Pennsylvania | 2004 | 0.276972 | | | 10,393.49 | 37,525.47 |
| Pennsylvania | 2005 | 0.281065 | 241 | 281 | 11,014.34 | 39,187.86 |

Table 10 Continued

| State | Year | Fiscal Effort | 4th Math | 8th Math | Per-Pupil | GSP |
|---|---|---|---|---|---|---|
| Pennsylvania | 2006 | 0.2811 | | | 11,530.25 | 41,018.29 |
| Pennsylvania | 2007 | 0.286116 | 244 | 286 | 11,097.86 | 38,788.00 |
| Pennsylvania | 2008 | 0.298896 | | | 12,035.05 | 40,265.00 |
| Pennsylvania | 2009 | 0.316125 | 244 | 288 | 12,511.61 | 39,578.00 |
| Rhode Island | 1992 | 0.293149 | 215 | 266 | 6,546.04 | 22,330.07 |
| Rhode Island | 1993 | 0.298545 | | | 6,938.12 | 23,239.80 |
| Rhode Island | 1994 | 0.305649 | | | 7,333.16 | 23,992.09 |
| Rhode Island | 1995 | 0.295972 | | | 7,469.43 | 25,236.92 |
| Rhode Island | 1996 | 0.30385 | 220 | 269 | 7,936.35 | 26,119.29 |
| Rhode Island | 1997 | 0.294205 | | | 8,306.62 | 28,234.18 |
| Rhode Island | 1998 | 0.301174 | | | 8,626.99 | 28,644.58 |
| Rhode Island | 1999 | 0.305237 | | | 9,048.84 | 29,645.27 |
| Rhode Island | 2000 | 0.301607 | 225 | 273 | 9,646.33 | 31,983.11 |
| Rhode Island | 2001 | 0.304631 | | | 10,115.62 | 33,206.11 |
| Rhode Island | 2002 | 0.305482 | | | 10,551.54 | 34,540.62 |
| Rhode Island | 2003 | 0.310699 | 230 | 272 | 11,377.34 | 36,618.55 |
| Rhode Island | 2004 | 0.313835 | | | 12,278.75 | 39,124.87 |
| Rhode Island | 2005 | 0.312189 | 233 | 272 | 12,685.24 | 40,633.25 |
| Rhode Island | 2006 | 0.325396 | | | 13,916.66 | 42,768.43 |
| Rhode Island | 2007 | 0.319583 | 236 | 275 | 12,611.70 | 39,463.00 |
| Rhode Island | 2008 | 0.330149 | | | 13,538.77 | 41,008.00 |
| Rhode Island | 2009 | 0.334295 | 239 | 278 | 13,707.11 | 41,003.00 |
| South Carolina | 1992 | 0.224348 | 212 | 261 | 4,435.82 | 19,772.05 |
| South Carolina | 1993 | 0.224267 | | | 4,623.80 | 20,617.40 |
| South Carolina | 1994 | 0.217713 | | | 4,761.14 | 21,868.91 |
| South Carolina | 1995 | 0.208985 | | | 4,797.49 | 22,956.15 |
| South Carolina | 1996 | 0.216713 | 213 | 261 | 5,095.56 | 23,512.99 |
| South Carolina | 1997 | 0.21846 | | | 5,371.25 | 24,586.91 |
| South Carolina | 1998 | 0.214826 | | | 5,642.75 | 26,266.61 |
| South Carolina | 1999 | 0.219576 | | | 6,002.95 | 27,338.79 |
| South Carolina | 2000 | 0.23407 | 220 | 266 | 6,545.47 | 27,963.76 |
| South Carolina | 2001 | 0.249622 | | | 7,210.44 | 28,885.46 |
| South Carolina | 2002 | 0.254648 | | | 7,549.30 | 29,646.03 |
| South Carolina | 2003 | 0.251329 | 236 | 277 | 7,759.16 | 30,872.53 |
| South Carolina | 2004 | 0.250157 | | | 7,892.78 | 31,551.29 |
| South Carolina | 2005 | 0.251679 | 238 | 281 | 8,301.80 | 32,985.69 |
| South Carolina | 2006 | 0.254708 | | | 8,795.13 | 34,530.29 |
| South Carolina | 2007 | 0.275134 | 237 | 282 | 8,532.72 | 31,013.00 |
| South Carolina | 2008 | 0.287597 | | | 9,169.75 | 31,884.00 |
| South Carolina | 2009 | 0.291749 | 236 | 280 | 9,277.33 | 31,799.00 |

Table 10 Continued

| State | Year | Fiscal Effort | 4th Math | 8th Math | Per-Pupil | GSP |
|---|---|---|---|---|---|---|
| South Dakota | 1992 | 0.199709 | | | 4,172.92 | 20,895.03 |
| South Dakota | 1993 | 0.196419 | | | 4,357.25 | 22,183.48 |
| South Dakota | 1994 | 0.196962 | | | 4,585.60 | 23,281.65 |
| South Dakota | 1995 | 0.197885 | | | 4,775.19 | 24,131.18 |
| South Dakota | 1996 | 0.186003 | | | 4,779.81 | 25,697.47 |
| South Dakota | 1997 | 0.188394 | | | 4,935.77 | 26,199.14 |
| South Dakota | 1998 | 0.189684 | | | 5,280.99 | 27,841.00 |
| South Dakota | 1999 | 0.195242 | | | 5,613.39 | 28,750.87 |
| South Dakota | 2000 | 0.197519 | | | 6,036.69 | 30,562.60 |
| South Dakota | 2001 | 0.208676 | | | 6,581.46 | 31,539.13 |
| South Dakota | 2002 | 0.198291 | | | 6,889.53 | 34,744.59 |
| South Dakota | 2003 | 0.200386 | 237 | 285 | 7,192.16 | 35,891.52 |
| South Dakota | 2004 | 0.198468 | | | 7,606.69 | 38,327.01 |
| South Dakota | 2005 | 0.201957 | 242 | 287 | 7,959.87 | 39,413.69 |
| South Dakota | 2006 | 0.200083 | | | 8,272.84 | 41,346.99 |
| South Dakota | 2007 | 0.234301 | 241 | 288 | 7,943.97 | 33,905.00 |
| South Dakota | 2008 | 0.223858 | | | 8,366.69 | 37,375.00 |
| South Dakota | 2009 | 0.230313 | 242 | 291 | 8,506.61 | 36,935.00 |
| Tennessee | 1992 | 0.167443 | 211 | 259 | 3,691.93 | 22,048.85 |
| Tennessee | 1993 | 0.172586 | | | 3,993.18 | 23,137.33 |
| Tennessee | 1994 | 0.168376 | | | 4,148.86 | 24,640.45 |
| Tennessee | 1995 | 0.17231 | | | 4,388.03 | 25,465.86 |
| Tennessee | 1996 | 0.174297 | 219 | 263 | 4,547.87 | 26,092.73 |
| Tennessee | 1997 | 0.182484 | | | 5,010.69 | 27,458.19 |
| Tennessee | 1998 | 0.182593 | | | 5,273.57 | 28,881.63 |
| Tennessee | 1999 | 0.183515 | | | 5,521.29 | 30,086.34 |
| Tennessee | 2000 | 0.190399 | 220 | 263 | 5,837.21 | 30,657.87 |
| Tennessee | 2001 | 0.194355 | | | 6,107.58 | 31,424.82 |
| Tennessee | 2002 | 0.195728 | | | 6,476.27 | 33,088.11 |
| Tennessee | 2003 | 0.194412 | 228 | 268 | 6,673.68 | 34,327.51 |
| Tennessee | 2004 | 0.193438 | | | 7,046.54 | 36,427.91 |
| Tennessee | 2005 | 0.196569 | 232 | 271 | 7,425.96 | 37,777.81 |
| Tennessee | 2006 | 0.192315 | | | 7,580.38 | 39,416.59 |
| Tennessee | 2007 | 0.213722 | 233 | 274 | 7,112.67 | 33,280.00 |
| Tennessee | 2008 | 0.22544 | | | 7,739.37 | 34,330.00 |
| Tennessee | 2009 | 0.231666 | 232 | 275 | 7,897.26 | 34,089.00 |
| Texas | 1992 | 0.194907 | 218 | 265 | 4,632.37 | 23,767.07 |
| Texas | 1993 | 0.188824 | | | 4,670.12 | 24,732.66 |
| Texas | 1994 | 0.19016 | | | 4,897.84 | 25,756.38 |
| Texas | 1995 | 0.195114 | | | 5,222.33 | 26,765.53 |

Table 10 Continued

| State | Year | Fiscal Effort | 4th Math | 8th Math | Per-Pupil | GSP |
|---|---|---|---|---|---|---|
| Texas | 1996 | 0.192466 | 229 | 270 | 5,473.48 | 28,438.69 |
| Texas | 1997 | 0.18705 | | | 5,735.56 | 30,663.24 |
| Texas | 1998 | 0.189327 | | | 5,909.77 | 31,214.59 |
| Texas | 1999 | 0.189334 | | | 6,161.22 | 32,541.53 |
| Texas | 2000 | 0.195088 | 233 | 275 | 6,771.45 | 34,709.73 |
| Texas | 2001 | 0.197219 | | | 7,038.60 | 35,689.19 |
| Texas | 2002 | 0.202832 | | | 7,302.24 | 36,001.49 |
| Texas | 2003 | 0.206015 | 237 | 277 | 7,714.12 | 37,444.44 |
| Texas | 2004 | 0.191996 | | | 7,711.35 | 40,164.13 |
| Texas | 2005 | 0.181098 | 242 | 281 | 7,814.13 | 43,148.60 |
| Texas | 2006 | 0.178319 | | | 8,085.33 | 45,342.05 |
| Texas | 2007 | 0.210237 | 242 | 286 | 7,818.08 | 37,187.00 |
| Texas | 2008 | 0.215687 | | | 8,320.13 | 38,575.00 |
| Texas | 2009 | 0.234069 | 240 | 287 | 8,539.76 | 36,484.00 |
| Utah | 1992 | 0.156555 | 224 | 274 | 3,040.33 | 19,420.20 |
| Utah | 1993 | 0.157232 | | | 3,180.17 | 20,225.94 |
| Utah | 1994 | 0.159675 | | | 3,438.59 | 21,534.90 |
| Utah | 1995 | 0.15902 | | | 3,655.64 | 22,988.55 |
| Utah | 1996 | 0.155473 | 227 | 277 | 3,867.47 | 24,875.53 |
| Utah | 1997 | 0.157096 | | | 4,045.18 | 25,749.79 |
| Utah | 1998 | 0.153199 | | | 4,255.70 | 27,778.91 |
| Utah | 1999 | 0.154573 | | | 4,477.91 | 28,969.60 |
| Utah | 2000 | 0.155804 | 227 | 275 | 4,692.42 | 30,117.36 |
| Utah | 2001 | 0.164156 | | | 5,029.25 | 30,637.04 |
| Utah | 2002 | 0.169458 | | | 5,294.09 | 31,241.39 |
| Utah | 2003 | 0.163887 | 235 | 281 | 5,247.37 | 32,018.20 |
| Utah | 2004 | 0.162112 | | | 5,426.66 | 33,474.71 |
| Utah | 2005 | 0.15934 | 239 | 279 | 5,653.83 | 35,482.79 |
| Utah | 2006 | 0.151554 | | | 5,809.38 | 38,331.99 |
| Utah | 2007 | 0.182225 | 239 | 281 | 5,683.41 | 31,189.00 |
| Utah | 2008 | 0.190325 | | | 5,765.13 | 30,291.00 |
| Utah | 2009 | 0.205871 | 240 | 284 | 6,356.26 | 30,875.00 |
| Vermont | 1992 | 0.303462 | | | 6,670.59 | 21,981.63 |
| Vermont | 1993 | 0.283384 | | | 6,410.80 | 22,622.32 |
| Vermont | 1994 | 0.280914 | | | 6,599.98 | 23,494.61 |
| Vermont | 1995 | 0.286171 | | | 6,749.54 | 23,585.66 |
| Vermont | 1996 | 0.277427 | 225 | 279 | 6,837.29 | 24,645.40 |
| Vermont | 1997 | 0.277049 | | | 7,171.17 | 25,884.11 |
| Vermont | 1998 | 0.282606 | | | 7,500.33 | 26,539.93 |
| Vermont | 1999 | 0.287572 | | | 7,983.96 | 27,763.31 |

Table 10 Continued

| State | Year | Fiscal Effort | 4th Math | 8th Math | Per-Pupil | GSP |
|---|---|---|---|---|---|---|
| Vermont | 2000 | 0.301847 | 232 | 283 | 8,799.30 | 29,151.49 |
| Vermont | 2001 | 0.311146 | | | 9,558.54 | 30,720.43 |
| Vermont | 2002 | 0.322372 | | | 10,228.76 | 31,729.73 |
| Vermont | 2003 | 0.327803 | 242 | 286 | 10,902.63 | 33,259.73 |
| Vermont | 2004 | 0.329425 | | | 11,675.38 | 35,441.65 |
| Vermont | 2005 | 0.33956 | 244 | 287 | 12,578.82 | 37,044.48 |
| Vermont | 2006 | 0.344681 | | | 13,376.60 | 38,808.61 |
| Vermont | 2007 | 0.367364 | 246 | 291 | 13,471.23 | 36,670.00 |
| Vermont | 2008 | 0.367806 | | | 14,300.28 | 38,880.00 |
| Vermont | 2009 | 0.394133 | 248 | 293 | 15,175.29 | 38,503.00 |
| Virginia | 1992 | 0.194904 | 221 | 268 | 4,877.96 | 25,027.49 |
| Virginia | 1993 | 0.19229 | | | 4,979.83 | 25,897.48 |
| Virginia | 1994 | 0.190296 | | | 5,108.94 | 26,847.30 |
| Virginia | 1995 | 0.191567 | | | 5,326.85 | 27,806.71 |
| Virginia | 1996 | 0.186507 | 223 | 270 | 5,432.54 | 29,127.74 |
| Virginia | 1997 | 0.185865 | | | 5,677.25 | 30,544.94 |
| Virginia | 1998 | 0.180807 | | | 5,936.21 | 32,831.72 |
| Virginia | 1999 | 0.176784 | | | 6,128.67 | 34,667.57 |
| Virginia | 2000 | 0.176865 | 230 | 277 | 6,491.05 | 36,700.66 |
| Virginia | 2001 | 0.19919 | | | 7,664.47 | 38,478.17 |
| Virginia | 2002 | 0.202139 | | | 7,928.29 | 39,221.86 |
| Virginia | 2003 | 0.202348 | 239 | 282 | 8,299.84 | 41,017.57 |
| Virginia | 2004 | 0.201136 | | | 8,760.58 | 43,555.61 |
| Virginia | 2005 | 0.203643 | 240 | 284 | 9,441.16 | 46,361.30 |
| Virginia | 2006 | 0.207936 | | | 10,046.27 | 48,314.22 |
| Virginia | 2007 | 0.246932 | 244 | 288 | 10,209.91 | 41,347.00 |
| Virginia | 2008 | 0.248603 | | | 10,659.11 | 42,876.00 |
| Virginia | 2009 | 0.249119 | 243 | 286 | 10,929.83 | 43,874.00 |
| Washington | 1992 | 0.207398 | | | 5,270.51 | 25,412.55 |
| Washington | 1993 | 0.213443 | | | 5,613.56 | 26,300.09 |
| Washington | 1994 | 0.210668 | | | 5,750.61 | 27,297.04 |
| Washington | 1995 | 0.213888 | | | 5,905.71 | 27,611.25 |
| Washington | 1996 | 0.209139 | 225 | 276 | 6,073.92 | 29,042.58 |
| Washington | 1997 | 0.201143 | | | 6,182.09 | 30,734.76 |
| Washington | 1998 | 0.192557 | | | 6,534.56 | 33,935.68 |
| Washington | 1999 | 0.179741 | | | 6,595.04 | 36,691.94 |
| Washington | 2000 | 0.184147 | | | 6,913.59 | 37,543.92 |
| Washington | 2001 | 0.194178 | | | 7,312.04 | 37,656.39 |
| Washington | 2002 | 0.199992 | | | 7,625.94 | 38,131.18 |
| Washington | 2003 | 0.200654 | 238 | 281 | 7,882.14 | 39,282.27 |

Table 10 Continued

| State | Year | Fiscal Effort | 4th Math | 8th Math | Per-Pupil | GSP |
|---|---|---|---|---|---|---|
| Washington | 2004 | 0.19796 | | | 8,051.18 | 40,670.79 |
| Washington | 2005 | 0.193879 | 242 | 285 | 8,362.37 | 43,131.81 |
| Washington | 2006 | 0.18962 | | | 8,702.48 | 45,894.35 |
| Washington | 2007 | 0.207278 | 243 | 285 | 8,376.95 | 40,414.00 |
| Washington | 2008 | 0.214819 | | | 9,098.86 | 42,356.00 |
| Washington | 2009 | 0.228733 | 242 | 289 | 9,549.81 | 41,751.00 |
| West Virginia | 1992 | 0.296113 | 215 | 259 | 5,077.74 | 17,147.99 |
| West Virginia | 1993 | 0.31 | | | 5,526.83 | 17,828.50 |
| West Virginia | 1994 | 0.298385 | | | 5,713.09 | 19,146.67 |
| West Virginia | 1995 | 0.306312 | | | 6,107.44 | 19,938.59 |
| West Virginia | 1996 | 0.3087 | 223 | 265 | 6,324.70 | 20,488.17 |
| West Virginia | 1997 | 0.307907 | | | 6,519.47 | 21,173.51 |
| West Virginia | 1998 | 0.311615 | | | 6,779.42 | 21,755.79 |
| West Virginia | 1999 | 0.316851 | | | 7,188.52 | 22,687.40 |
| West Virginia | 2000 | 0.332809 | 225 | 271 | 7,636.71 | 22,946.26 |
| West Virginia | 2001 | 0.338472 | | | 8,147.98 | 24,072.80 |
| West Virginia | 2002 | 0.338569 | | | 8,450.78 | 24,960.29 |
| West Virginia | 2003 | 0.351404 | 231 | 271 | 9,025.15 | 25,683.10 |
| West Virginia | 2004 | 0.329371 | | | 9,076.45 | 27,556.92 |
| West Virginia | 2005 | 0.318485 | 231 | 269 | 9,320.78 | 29,266.03 |
| West Virginia | 2006 | 0.318751 | | | 9,756.02 | 30,607.05 |
| West Virginia | 2007 | 0.32538 | 236 | 270 | 9,610.74 | 29,537.00 |
| West Virginia | 2008 | 0.319551 | | | 9,852.08 | 30,831.00 |
| West Virginia | 2009 | 0.321767 | 233 | 270 | 10,367.00 | 32,219.00 |
| West Virginia | 2010 | 0.338317 | | | 11,043.00 | 32,641.00 |
| Wisconsin | 1992 | 0.273509 | 229 | 278 | 6,138.92 | 22,444.99 |
| Wisconsin | 1993 | 0.275327 | | | 6,475.44 | 23,519.10 |
| Wisconsin | 1994 | 0.268579 | | | 6,717.20 | 25,010.14 |
| Wisconsin | 1995 | 0.267962 | | | 6,930.34 | 25,863.11 |
| Wisconsin | 1996 | 0.261727 | 231 | 283 | 7,093.93 | 27,104.28 |
| Wisconsin | 1997 | 0.261769 | | | 7,397.99 | 28,261.49 |
| Wisconsin | 1998 | 0.253212 | | | 7,680.04 | 30,330.49 |
| Wisconsin | 1999 | 0.254385 | | | 8,062.40 | 31,693.72 |
| Wisconsin | 2000 | 0.253806 | | | 8,298.64 | 32,696.79 |
| Wisconsin | 2001 | 0.261343 | | | 8,797.41 | 33,662.35 |
| Wisconsin | 2002 | 0.26636 | | | 9,236.97 | 34,678.51 |
| Wisconsin | 2003 | 0.26616 | 237 | 284 | 9,537.66 | 35,834.38 |
| Wisconsin | 2004 | 0.259638 | | | 9,833.87 | 37,875.31 |
| Wisconsin | 2005 | 0.258339 | 241 | 285 | 10,140.98 | 39,254.52 |
| Wisconsin | 2006 | 0.256358 | | | 10,483.62 | 40,894.40 |

Table 10 Continued

| State | Year | Fiscal Effort | 4th Math | 8th Math | Per-Pupil | GSP |
|---|---|---|---|---|---|---|
| Wisconsin | 2007 | 0.284826 | 244 | 286 | 10,267.13 | 36,047.00 |
| Wisconsin | 2008 | 0.286224 | | | 10,680.18 | 37,314.00 |
| Wisconsin | 2009 | 0.300865 | 244 | 288 | 11,078.46 | 36,822.00 |
| Wyoming | 1992 | 0.203173 | 225 | 275 | 5,811.71 | 28,604.76 |
| Wyoming | 1993 | 0.198205 | | | 5,822.38 | 29,375.52 |
| Wyoming | 1994 | 0.201125 | | | 5,899.13 | 29,330.62 |
| Wyoming | 1995 | 0.205164 | | | 6,160.08 | 30,025.15 |
| Wyoming | 1996 | 0.193732 | 223 | 275 | 6,243.34 | 32,226.68 |
| Wyoming | 1997 | 0.196751 | | | 6,448.21 | 32,773.45 |
| Wyoming | 1998 | 0.221888 | | | 6,717.85 | 30,275.86 |
| Wyoming | 1999 | 0.228221 | | | 7,393.11 | 32,394.57 |
| Wyoming | 2000 | 0.226512 | 229 | 277 | 7,944.03 | 35,071.21 |
| Wyoming | 2001 | 0.220819 | | | 8,465.51 | 38,336.91 |
| Wyoming | 2002 | 0.237058 | | | 9,320.84 | 39,318.76 |
| Wyoming | 2003 | 0.229097 | 241 | 284 | 9,906.43 | 43,241.14 |
| Wyoming | 2004 | 0.219156 | | | 10,350.56 | 47,229.27 |
| Wyoming | 2005 | 0.207039 | 243 | 282 | 11,086.86 | 53,549.74 |
| Wyoming | 2006 | 0.21629 | | | 12,414.96 | 57,399.55 |
| Wyoming | 2007 | 0.305766 | 244 | 287 | 13,217.05 | 43,226.00 |
| Wyoming | 2008 | 0.278369 | | | 13,840.24 | 49,719.00 |
| Wyoming | 2009 | 0.318842 | 242 | 286 | 14,572.67 | 45,705.00 |

# VITA

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## Academic Degrees

Ph. D. Educational Leadership, May 2011 Old Dominion University
Ed.S. Administration and Supervision, December 2009, Old Dominion University
M.S. Early Childhood Education, December 2000, Old Dominion University
B.S. Interdisciplinary Studies, May 1999, Old Dominion University

## Professional Experience

**Coordinator**

August 2011-Present

K-12 Instructional Coordinator VBCPS Virginia Beach, VA

Provide professional development and support to administrators and teachers in various schools K-12 schools.

August 2010-July 2011

K-5 Curriculum Coordinator VBCPS Virginia Beach, VA

Created curriculum and provided professional development and support to administrators and teachers in various elementary schools.

**Instructional Specialist**

August 2009-July 2010

K-5 Instruction Specialist VBCPS Virginia Beach, VA

Provide instructional support to 14 elementary schools

**Teacher**

Jan. 2001-June 2009 Various Schools Virginia Beach, VA and Fairfax County, VA

## Presentations

**National Title I Conference 2011:** Lesson Study: Promoting and Sustaining Professional Learning Communities in Title I Schools

**Virginia State Reading Conference 2009:** Teaching Writing in a Caring Community